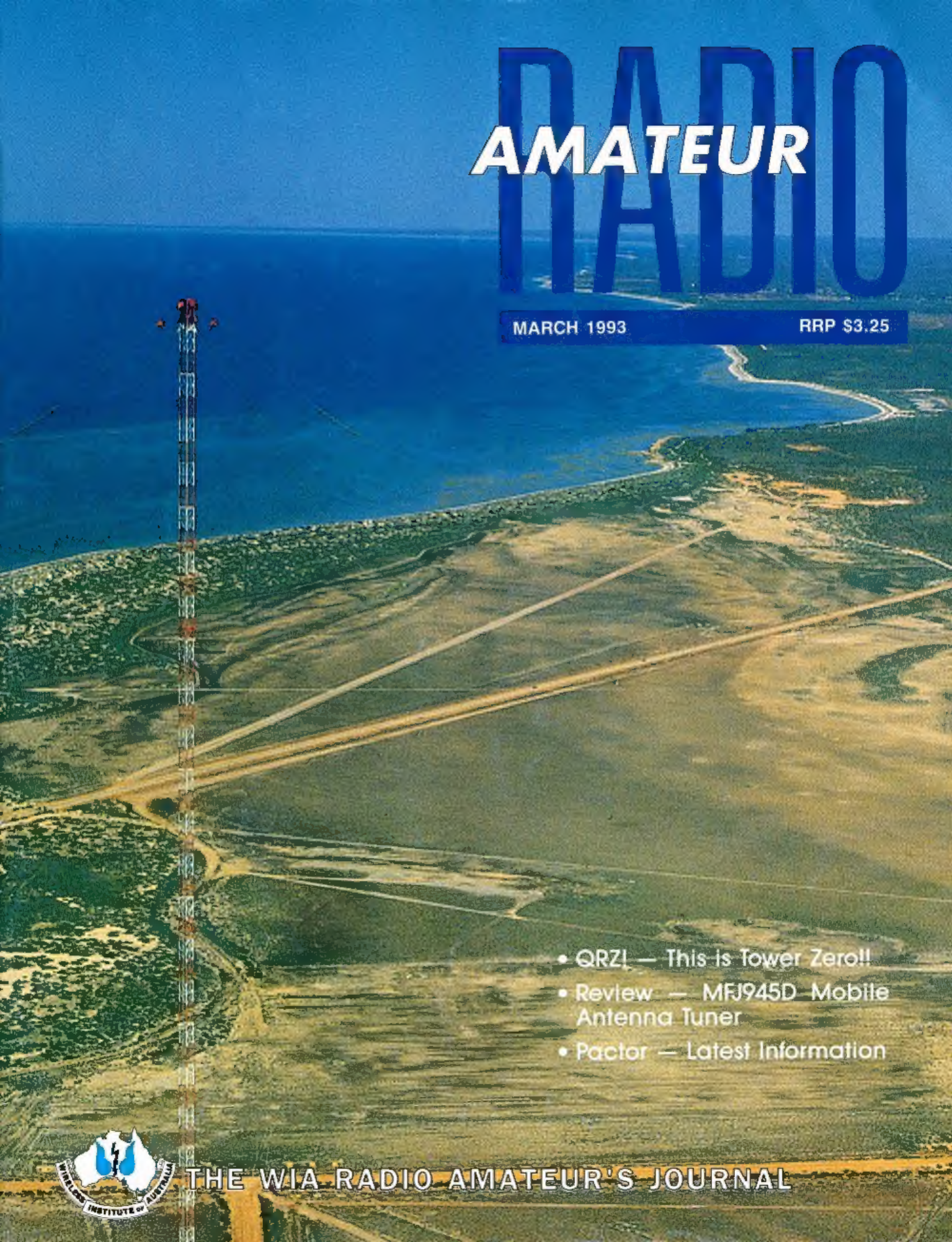
AMATEUR RADIO

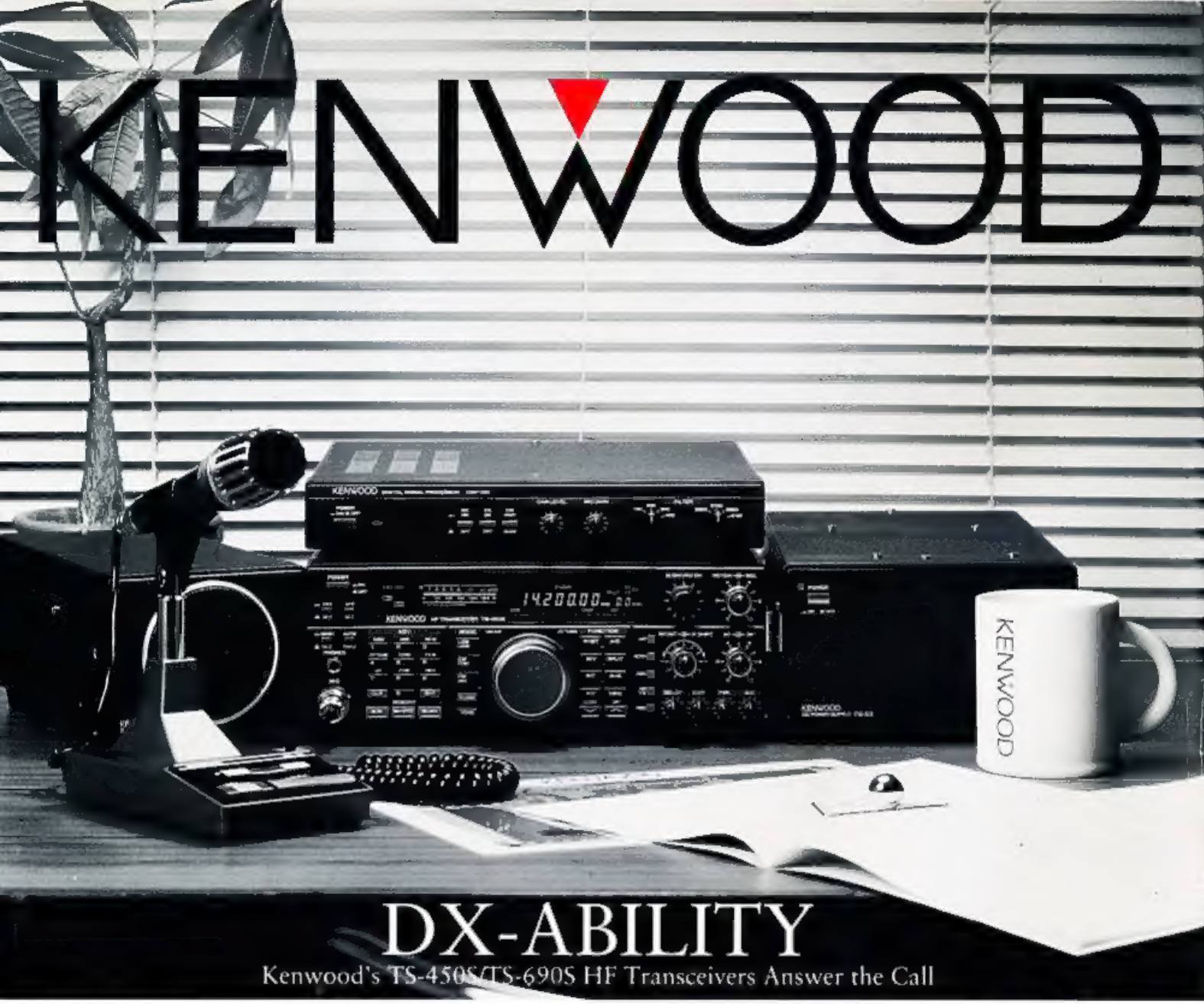
MARCH 1993 RRP $3.25



- QRZ! — This is Tower Zero!!
- Review — MFJ945D Mobile Antenna Tuner
- Pactor — Latest Information

THE WIA RADIO AMATEUR'S JOURNAL

KENWOOD



DX-ABILITY

Kenwood's TS-450S/TS-690S HF Transceivers Answer the Call

Wherever you are, whatever the situation, you can always count on Kenwood's TS-450S and TS-690S for tough, dependable performance. Products of world-famous Kenwood engineering, these versatile HF transceivers are designed for SSB, CW, AM, FM and FSK modes of operation on all Amateur bands, including the WARC bands. To further enhance capabilities, choose the optional DSP-100 Digital Signal Processor. The AT-450 Automatic Antenna Tuner is built into the TS-450S, and is available as an internal option for the TS-690S. Along with multi-function operation and the highest levels of quality and performance, both models offer yet another advantage: ultra-compact dimensions ideal for DXpeditions and mobile use.

Enjoy all the advantages of these superior features:

■ Superior receiver dynamic range of 108dB ■ Kenwood's exclusive AIP (Advanced Intercept Point) system ■ General coverage receiver ■ Automatic antenna tuner (TS-450S only) ■ Inbuilt automatic ATU option (TS-690S only) ■ Ultra-compact design ■ Excellent split frequency operation ■ CW pitch and CW reverse mode selection ■ Digital bar meter and multi-function LCD display ■ IF shift circuit ■ Dual-mode noise blanker (pulse or 'woodpecker') ■ 1Hz fine tuning ■ 100 memory channels ■ 100 watts output on all HF bands ■ 50 watts output on 50 to 54 MHz six metre band (TS-690S only)

HF TRANSCEIVER **TS-450S/TS-690S** HF TRANSCEIVER

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
(INCORPORATED IN N.S.W.)

8 Figtree Drive, Australia Centre, Homebush, N.S.W. 2140
Phone (02) 746 1519, (02) 746 1888, Fax (02) 746 1509
Call now for further information and the name of your nearest authorised Kenwood dealer.

Kenwood Electronics Australia Pty Ltd only warrants products purchased from their authorised Australian dealers.

Please phone, mail or fax for information
Name.....
Address.....
..... Postcode.....
Publication..... Issue .....
Model.....

AMATEUR RADIO

THE WIA RADIO AMATEUR'S JOURNAL

Vol 61 No 3 ISSN 0002-6859 March 1993

Amateur Radio is published by the Wireless Institute of Australia, ACN 004 920 745 as its Official Journal, on the last Friday of each month.

EDITORIAL GROUP
Publisher
Bill Roper VK3ARZ
Editor
Bill Rice VK3ABP
Production Editor
Bruce Bathols VK3UV
Senior Technical Editor
Peter Gibson VK3AZL
Technical Editors
Evan Jarman VK3ANI
Gil Sones VK3AUI
Bob Tait VK3UI
Marketing
Norm Eyres VK3ZEP
Bruce Kendall VK3WL
Contributing Editor
Ron Fisher VK3OM
ASSOCIATE TECHNICAL EDITORS
David Brownsey VK4AFA
Don Graham VK6HK
Peter O'Connor VK4KIP
Phil Steen VK4APA
Roy Watkins VK6XV
PROOF READERS
Allan Doble VK3AMD
Jim Payne VK3AZT
Graham Thornton VK3IY
John Tutton VK3ZC
DRAFTING
Vicki Griffin VK3BNK
ADVERTISING
Brenda Edmonds VK3KT
June Fox
CIRCULATION
Margaret Allen
Chris Russell VK3LCR

All contributions and correspondence concerning the content of *Amateur Radio* should be forwarded to:
Amateur Radio
PO Box 300
Caulfield South VIC 3162

REGISTERED OFFICE
3/105 Hawthorn Road
Caulfield North VIC 3161
Telephone: (03) 528 5962
Fax: (03) 523 8191

Business Hours: 9.30 am to 3 pm weekdays

Deadlines	Editorial	Hamads
April	8/3/93	10/3/93
May	12/4/93	14/4/93
June	10/5/93	12/5/93

Delivery of AR: If this magazine is not received by the 15th of the month of issue, and you are a financial member of the WIA, please check with the Post Office before contacting the registered office of the WIA. ©

CONTENTS

Cover
A view taken from the top of Tower Zero in the Exmouth Gulf, North-Western Australia, looking North. Tower Zero is 396 metres high, and amateur repeater VK6REX is located on top of the tower. It provides coverage to a broad coastal area, and with ducting is workable in Perth. Please refer to the article "QRZ! This is Ed" on page 10.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society Founded 1910

Representing the Australian Amateur Radio Service
Member of the International Amateur Radio Union
Registered Federal office of the WIA:
3/105 Hawthorn Rd, Caulfield North, Vic 3161

All Mail to:
PO Box 300, Caulfield South, Vic 3162
Telephone: (03) 528 5962
Fax: (03) 523 8191

Business Hours: 9.30am to 3.00pm on weekdays

General Manager and Secretary:
Bill Roper VK3ARZ

COUNCIL

President	Ron Henderson	VK1RH
VK1 Federal Councillor	Rob Apathy	VK1KRA
VK2 Federal Councillor	Roger Harrison	VK2ZTB
VK3 Federal Councillor	Peter Maclellan	VK3BWD
VK4 Federal Councillor	Rodger Bingham	VK4HD
VK5 Federal Councillor	Bill Wardrop	VK5AWM
VK6 Federal Councillor	Neil Penfold	VK6NE
VK7 Federal Councillor	Jim Forsyth	VK7FJ

FEDERAL CO-ORDINATORS

AMSAT:	Graham Ratcliff	VK5AGR
Awards:	John Kelleher	VK3DP
Contest Manager:	Peter Nesbit	VK3APN
Education:	Brenda Edmonds	VK3KT
EMC:	Hans Ruckert	VK2AOU
FTAC:	John Martin	VK3ZJC
Historian:	John Edmonds	VK3AFU
Honorary Legal Counsel:	George Brzostowski	VK1GB
IARU:	Kevin Olds	VK1OK
Int'l Travel Host Exch:	Ash Nallawalla	VK3CIT
Intruder Watch:	Gordon Loveday	VK4KAL
Media:	Roger Harrison	VK2ZTB
QSL Manager(VK9,VK0):	Neil Penfold	VK6NE
Standards:	Roger Harrison	VK2ZTB
Videotapes:	Bob Godfrey	VK4BOB
WARC & CCIR	David Wardlaw	VK3ADW
WICEN:	Leigh Baker	VK3TP

Editor's Comment

Bill Rice VK3ABP
Editor

So Much to Do, So little Time

The title above is a very common complaint around your Editor's QTH. Even though (theoretically) I retired from full-time work nearly six years ago, like most retirees I still wonder how "I ever had the time to go to work"! I don't want to bore you with an account of all that needs doing, but you may be interested in some of the items for AR which (hopefully) will be written in the next few months.

A few weeks ago the opportunity came my way to acquire some current information about Australia's Over the Horizon Radar, Jindalee. This system is to become operational in about three years' time from two stations, one near Longreach, the other near Laverton in WA.

As we well know from our experience with the infamous "Russian Woodpecker", now obsolete and gone, it is possible for an OTHR to interfere intolerably with communications, not only by amateurs. It is also possible, by clever techniques, for an OTHR to co-exist with other spectrum users and barely be noticeable. How the designers of Jindalee have tackled this and other problems will be the topic of the article.

We last had an article on Jindalee by Ian Hunt VK5QX back in April 1985. Much more can now be said than was then possible, so I'm looking forward to writing the story as much as you are to reading it.

I noticed in that same issue (April 1985) that my editorial was one of those "stick the neck out and risk it" efforts, looking forward to 2060 and entitled "Crystal Ball". In 2060 the WIA will be 150 years old, presuming that it, amateur radio, or civilisation as we know it still exists! One of my rash predictions was that by then "we may have begun to cool the climate of Venus". In the latest "National Geographic" there is a magnificent article about Venus with many marvellous "photographs" of its surface.

They are actually radar pictures taken by the Venus-orbiting satellite "Magellan" over a two year period. The Venusian atmosphere is not only so thick as to be largely opaque to light, but is also mostly composed of sulphuric acid! Perhaps I was a little optimistic! Is there a market for gigatonnes of sulphuric acid?

Returning to Earth, Ron VK3OM and I hope eventually to tell you about our trip last year to Far North Queensland, the Top End, and the Centre. And then there's the story about XYL and I visiting Indonesia last September/October. And right now there's a boat to prepare for the annual "Marlay Madness". See you later, folks, there's work to do!

ar

WIA News

From the WIA Federal Office

New Regs "Real Soon Now"

It is expected that news of final proposals for the new Amateur Regulations will be available within the next two months.

This was conveyed in a letter from the Assistant Secretary of The Department of Transport and Communications, Radiocommunications Operations Branch, Gwen Andrews, who wrote to the WIA's general manager on the 1st of February.

The new Radiocommunications Act passed through parliament in November last year, one of the consequences of which is the establishment of the Spectrum Management Agency (SMA), planned for 1st July this year.

Part of this process involves the changes to the Amateur Regulations foreshadowed in a speech given before the SEANET Convention in Darwin on Saturday night 31st October by the Honourable Warren Snowden MP, standing in for the Minister for Transport and Communications, Senator Bob Collins.

In her letter, Gwen Andrews indicates that the final proposals on the Amateur Regulations are being reviewed by senior management right now.

She says that the situation leading up to the introduction of new legislation precludes the new arrangements being introduced earlier.

As the proposals represent a significant deregulation of the Amateur Service, she expresses the hope that they will be worth waiting for.

Telecom Passes Buck on Phone Interference

If you, as a radio amateur, cause interference to a neighbour's telephone, then it's your fault, not the telephone's — that's Telecom policy.

And if the problem can't be readily fixed by a Telecom technician swapping the suffering phone for an "EMI resistant" unit, then the suffering neighbour has to pay for any subsequent solution or, failing that, put up with the interference. That's Telecom policy.

On investigating telephone interference problems, once it has been proved that the

WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts		1993 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Christopher Davis Jan Burrell Ken Ray	VK1DO VK1BR VK1KEN	3.570 MHz 2m ch 6950 Rebroadcast Mondays 8pm 70 cm ch 8525 2000 hrs Sun	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK2	NSW Division 109 Wigram Street Parramatta NSW (PO Box 1066 Parramatta 2124 Phone (02) 689 2417 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Terry Ryeland Bob Lloyd Jones Bob Taylor Mon-Fri 11.00-14.00 Wed 1900-2100)	VK2UX VK2YEL VK2AOE	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 52.120, 52.525, 144.120, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay via a local 2 metre repeater. Sunday 1000 and 1915. Highlights included in VK2AWX Newcastle Monday 1930 on 3.593 plus 10mx, 2mx, 70cm, 23cm. News headlines by phone (02) 552 5188. Some broadcast text can be found on the Packet network.	(F) (G) (S) (X)	$86.75 $63.40 $38.75
VK3	Victorian Division 403 Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours	Jim Linton Barry Wilton Rob Halley Tue & Thur 0830-1630	VK3PC VK3XV VK3XLV	1.840MHz AM, 3.615 SSB, 7.085 SSB, 53.900 FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Mildura, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday.	(F) (G) (S) (X)	$72.00 $56.00 $44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 284 9075	President Secretary Treasurer	John Aarsse Ken Ayers David Travis	VK4QA VK4KD VK4ATR	1.825, 3.085, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz. 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK5	South Australian Division 34 West Thebarton Road Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Bob Allen Roland Bruce Bill Wardrop	VK5BJA VK5OU VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 145.000 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North,(146.900 FM(R) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.625, 438.425 (NT) 3.556m 146.5000, 0900 hrs Sunday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 344 5241	President Secretary Treasurer	Cliff Bastin Phil Street Bruce Hedland-Thomas	VK6LZ VK6KS VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.	(F) (G) (S) (X)	$80.75 $49.80 $32.75
VK7	Tasmanian Division 148 Derwent Avenue Lindisfarne TAS 7015	President Secretary Treasurer	Tom Allen Ted Beard Peter King	VK7AL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) (G) (S) (X)	$67.00 $53.65 $39.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).						

Membership Grades

Full (F) Pensioner (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three-year membership available to (F) (G) (X) grades at fee x 3 times.

Note: All times are local. All frequencies MHz.

interference has been induced into the telephone, *the customer is to be told that the telephone is not faulty.* That's Telecom policy.

Telecom (or AOTC) recently issued its policy on electromagnetic interference (EMI) with regard to telephone maintenance. The policy states that Telecom does not accept that EMI is a fault with the telephone. They identified that EMI includes interference from:

— induced power hum
— radio stations
— ham radio
— CB radio

Hence, amateur radio stations are clearly identified as a source of interference and Telecom staff are told that if interference occurs, *you're* at fault and that's what the customer is to be told.

Clearly, Telecom's policy is in conflict with fact and physics. Does Telecom management not understand the science of cause and effect?

To deal with EMI problems, an "EMI resistant" version of the T200 telephone is available. Telecom's policy is that, in interference cases, these are to replace the first rental phone at no additional cost to customers. If additional rental phones are involved, customers have the choice of paying extra rental for an EMI resistant unit or buying one outright. If the EMI resistant phone doesn't solve the problem, tough — Telecom has no other rental units.

If the EMI problem can't be diagnosed or assessed over the phone (in calls to 1100), customers with EMI problems will be charged service call fees and labour costs to have a technician attend their premises to further assess the problem or replace the unit with an EMI resistant phone.

Customers owning non-Telecom "sale" phones only get 14 days from date of purchase to discover the problem and return the phone for a refund.

It is expected a "sale" version of the EMI resistant T200 telephone will be available in May.

Note that, if you discover your station is causing interference to a telephone, you could run foul of AUSTEL as it is an offence to make unapproved modifications to telephone installations — see *Technical Correspondence*, AR, February 1993, page 61. Penalty, up to $12,000.

Oops! — Feb AR

The "Cover" photo caption on page 1 of the February issue wrongly accredited Musa Manarov with being given Honorary LIFE Membership of the Victorian Division — Musa was actually granted only Honorary Membership.

Amateur Operation on 165-190 kHz

Australian amateurs can conduct experiments on the 165-190 kHz band, by applying for an experimental licence from the Department of Transport and Communications.

In a letter to the general manager of the Federal Office in January, the Director of Licensing Operations, Radio Communications Operations Branch, George McLintock, said that while the Department is not prepared to allow amateurs general access to this band as an automatic component of an amateur licence, they have no objection for experimental use of frequencies within this band, which is allocated to aeronautical radionavigation services.

Amateurs wishing to experiment with radiocommunication on 165-190 kHz should apply to the Department for an experimental licence, which carries an annual fee of $90. Ask for a general application form, RB57. You have to specify the location of the transmitter.

At this stage, the Department will agree to the use of all frequencies within the band on a single experimental licence and will allow automatic renewal, but gives no guarantees on future policy on this.

Mr McLintock noted that no protection is given against any new CAA services in the band.

AUSTEL Investigation

AUSTEL, the Australian Telecommunication Authority, is conducting an investigation into "emerging communication technologies for the delivery of wireless personal communication services" (see *WIANEWS*, February issue, page 4).

They advertised in late January, seeking input from interested parties to determine marketplace development and the implications of these emerging "wireless" (ie, radio) technologies in order to develop policy.

These personal communication services (PCS) include wireless LANs (local area networks) for computer systems (see *WIANEWS* December, page 4), low power voice communication systems, new personal portable telephone systems, etc.

As reported, AUSTEL is due to report to the Minister for Transport and Communication (whoever that may be, following the March election) by mid-year.

Submissions close April 1, so there's still time if you wish to put your bib in. A discussion paper is available from AUSTEL by calling 008 33 5526 or, in Melbourne, 828 7305. A copy has been ordered for dissemination and discussion among Federal Councillors.

Chipmaker Goes for Wireless

National Semiconductor, US-based multinational maker of integrated circuits, has announced that it will develop chips for wireless personal communication service applications.

The company announced it is developing a family of silicon radio frequency (SiRF) ICs for use in wireless computer LANs, personal portable and cellular telephones, wireless telephone switchboards (PABXs), pocket communicators and devices described as "personal digital assistants".

Big money is involved, wireless PCS is booming, world-wide. The value of the market for just the ICs in these devices was worth US$375 million in 1991 and is predicted to reach around US$1 billion by 1996.

JOTA Success

The 1992 Jamboree on the Air (JOTA) scored a variety of notable successes, with high Australian participation compared with other world countries, even though total numbers participating were slightly down compared with 1991.

Over 600 amateur stations participated, involving 1263 amateurs, 19102 Scouts and 8030 guides.

Australian JOTA stations made contact with other JOTA stations in 36 countries around the world, New Zealand topping the tally in number of stations contacted, closely followed by the US and Japan.

JOTA activities scored many publicity successes for both amateur radio and scouting, with media stories

and photographs appearing all round the country.

Thanks to Peter Hughes VK6HU, National Co-ordinator for the 35th Jamboree on the Air.

Special Event Station Scores Well

The Special Event station callsign VI150SYD, obtained as part of the Sesquicentennial Celebrations of the founding of the City of Sydney, made its presence felt in over 160 DXCC countries, recording a total of 6257 contacts.

Eight amateur clubs or groups activated the stations, including the NSW Division on their display at the Australian Broadcasting Commission's "Picnic in the Park" 60th birthday celebrations.

Organised and managed by Stephen Pall VK2PS, NSW Division Special Projects Officer, VI150SYD was heard, seen and worked on CW, SSB, RTTY, packet, FM and ATV on 12 amateur bands from 1800 kHz through 450 MHz. Congratulations to all involved.

Aussies on IARU Council

Three Australian amateurs grace the nine-member Administrative Council of the International Amateur Radio Union (IARU).

They are: Michael Owen VK3KI — Vice President, David Rankin VK3QV/9V1RH — Chairman IARU Region III, and David Wardlaw VK3ADW — Director IARU Region III.

The score for other nations is: W — two, then PA0, G3, HK3 and VE3.

Thanks to Federal Councillor Neil Penfold VK6NE for the information.

ARRL Membership Growing Again

Membership in the ARRL grew 3.5% over 1992, reports *The ARRL Letter* for January 11.

ARRL membership had been declining for some years, as other amateur societies around the world have experienced, but the USA's regulatory authority, the Federal Communications Commission (FCC), recently introduced a number of deregulatory measures and a new licence grade, which met almost instant success.

WIA Policy Revamps

Continuing with publication of the 12 revamped Federal Policy items, commenced in last month's WIA News, this month we present three more, covering affiliated organisations, third party traffic and intruders.

Affiliated Organisations

Under Article 103, Regulation 1:

The Board may accept any duly constituted group, club or organisation as an affiliated organisation (hereafter referred to as an affiliate) which in the judgement of the Board has objects such that:

(a) it allows membership not restricted to persons living in any particular part or parts of Australia: and
(b) it has objects consistent with the objects of the Institute; and
(c) it confers no voting rights or any other rights whatsoever apart form those listed herein: and
(d) that not less than (75%) of the members shall at all times be licensed radio amateurs: and
(e) that not less than (55%) of its members at any time shall be financial

members of a Division of the Institute and resident within Australia.

Under Regulation 2 — an affiliate shall:

(a) pay an annual fee equivalent to an amount not exceeding the Federal element for the ensuing year applicable to the subscription of a full qualification city member.
(b) be entitled for so long as it is affiliated, to the use of the Institute's emblem and the words' Wireless Institute of Australia — affiliated organisation" on its stationery and publications, and shall be entitled to subscribe to one copy of "Amateur Radio" as a direct subscriber: and
(c) submit an annual report including its current membership list not later than one month prior to each Federal Convention.

Under Regulation 3:

An affiliate shall cease to be an affiliated organisation if the annual fee is not paid by the due date or if the Board so directs.

Under Regulation 4:

All applications for affiliation to the Institute shall be made in writing to the Secretary together with a true copy of its Constitution.

Reference: 82.081 Appendix A

Previous version: 82.081 Appendix A

Revised: Jul 92 Board meeting & Oct 92 Board meeting

Adopted at Oct 92 Board meeting.

Third Party Traffic

This Board NOTING:

The ability of the Amateur Radio Service to provide public service through the use of its frequency bands, specialised equipment and knowledge;

the ongoing need to promote the Amateur Radio Service to the general public;

a desire to develop operating skills within the Amateur Radio Service;

the potential for the development of national and international goodwill;

an identified requirement for emergency networks operating in support of official counter disaster agencies;

the right of amateur radio operators to choose whether or not to be involved in such activities;

an extant Council Resolution to seek third party traffic arrangements with;

a. all those countries with whom the USA has TPT arrangements,
b. the United Kingdom, and
c. all countries where Australian forces are located.

RESOLVES to:

support the use of third party traffic handling privileges on all amateur bands and by all interested amateur radio operators;

support the existence of networks for facilitating third party traffic handling;

supports the existence of emergency networks operating in support of official counter disaster agencies;

educate interested members in third party traffic handling techniques, procedures and responsibilities;

continue to pursue the establishment of third party traffic arrangements with countries identified in the Council Resolution.

References: 84.09.16 88.12.14/2 IARU AC Resolution 85-7

Previous version: 82.092/1 Appendix C9

Revised: May 92 & Jul 92 Board meeting

Adopted: Oct 92 Board meeting.

Intruder Watch

This Board OBSERVING:

The presence of unauthorised non-amateur stations in exclusive amateur bands;

under ITU Radio Regulations (342), any administration may assign any frequency providing that no harmful interference is caused to another station operating in conformity with the international Radio Regulations;

the ITU Convention requires all members to take steps to prevent interference;

administrations can only know of interference if it is reported by another administration;

only an administration can complain to another administration about harmful interference being caused to a station licensed by it, by a station of another administration;

despite the "frequency agility" of the amateur service there are many known cases of harmful interference being caused to amateur stations;

if inaccurate or insufficient reports are provided an administration is unlikely to act;

the definition of harmful interference when applied to the amateur service, is interference which seriously degrades, obstructs or repeatedly interrupts amateurs operating in accordance with the regulations;

intruder watching requires a special dedication on the part of the amateur with no expectation of immediate results;

the IARU is examining means of injecting intruder watch reports direct to the ITU to supplement reports to national authorities,

and NOTING IARU Region III policy, namely:

the object of Intruder Watch is to constrain as far as possible the use of amateur bands by stations in derogation of the Table of Frequency Allocations by encouraging national Societies to get their own administrations to act in accordance with the Radio Regulations to seek the cessation of such use, on the basis of the administration's own monitoring, or by the administration in accordance with Radio Regulation No. 1873.

This Board RESOLVES that:

intruder watching is important to the amateur service;

intruder watching in Australia be coordinated by a Federal Intruder Watch coordinator who shall furnish reports to the Region III coordinator and the Australian authorities;

Divisions be exhorted to appoint Divisional Intruder Watch Co-ordinators to promote intruder watching and forward reports to the Federal Co-ordinator;

a standardised reporting format be used by Australian amateurs;

individual watchers be encouraged by such means as Freepost, demonstration tapes, intruder watch nets, broadcast segments, an AR column and Certificates of Merit.

Intensive coordinated campaigns be directed against specific regular intruders.

References: 48/4 83.095/3 Appx B2 84.09.06 85.13.03

Previous version: 83.095/3 Appx B2

Revised Jun 92 & Jul 92 Board meeting

Adopted: Oct 92 Board meeting

ar

Celebrating our 10th Anniversary with a

CASH REBATE OFFER

on selected transceivers and receivers.

Transceivers		Receivers	
IC-2iA	- $80	IC-R1	- $80
IC-P2AT	- $80	IC-R100	- $100
IC-2SRA	- $80	IC-R72A	- $150
IC-728	- $150	IC-R7100	- $200
IC-729	- $150	IC-R9000	- $200

To celebrate our 10th Anniversary we are offering a cash rebate on these selected units purchased between the 15th of February and the 31st of March 1993. Better hurry, an offer this good only comes once every 10 years.

For more information on any of these units, call Icom Australia or visit your nearest authorised Icom dealer. Come and see us at the Gosford Convention on the 28th of February and you can see all these units at the Icom stand.

Conditions

1. Available only through Icom's authorised Australian dealers during period of offer on nominated items.
2. Your authorised dealer will provide you with a rebate claim form which must be returned to Icom Australia with the applicable warranty card to be eligible for our rebate.
3. All claims must be sent to Icom Australia, 7 Duke St, Windsor 3181, before April 15 1993 to be eligible for the rebate.

ICOM

Icom Australia Pty Ltd P. O. Box 1162 Windsor Victoria 3181 Telephone (03) 529 7582
A.C.N. 006 092 575

PACTOR — The Magic Successor to RTTY and AMTOR

Colin Richards 9M2CR
73 Jalan Pantai
71000 Port Dickson
Malaysia

The article by Roy Philpott DJ0OW in January (PACTR...Here and Now) was a good introduction to this new digital mode. Colin 9M2CR now takes over the theme in greater detail.

No-one now doubts that HF Packet with its AX.25 protocol was a disaster from day 1. In fairness to the Packet pioneers, the 300-baud HF facility was a frill added to a system that was designed specifically for VHF/UHF. Packet, on HF, was another story. Ionospheric noise ruined the CRC check, multi-path smearing smothered the data bits, and noise plus the "hidden transmitter" syndrome shattered the CSMA notion of multiple-station channels. Yet its very failure served a salutary purpose by triggering serious investigation into other ways of sending data more efficiently in the HF environment. A review of past history could be rewarding.

RTTY has long had its band of devotees, who in an earlier era were fascinated by their mechanical teleprinters — those wondrous assemblages of cams, cranks and coil-springs. In the RTTY fraternity there is still an enduring affection for the old "mills", and to this day many a Creed, a Siemens, or an Olivetti continues to give stalwart if noisy service. Yet RTTY suffers from a number of handicaps on the HF bands. Teleprinters use the ITU 5-unit Telegraph Alphabet No 2 which allows a mere 32 possible combinations, so that only UPPER CASE letters may be used. A Figures/Letters shift had to be provided to cater for the full alphabet, numerals and some punctuation marks.

A second problem with RTTY is that it is asynchronous; a receiving station hasn't the vaguest idea when the next data block will arrive. The RTTY terminal only detects the start of an incoming character when the Mark tone changes to Space. It then clocks the next 5 bits, prints the equivalent character, and waits for the next mark-to-space transition. Unhappily, this may not be a genuine signal but merely some of the noise that afflicts most HF radio paths. The result is a garbled character. The third major drawback of RTTY is that the sending station has no way of knowing whether the receiving station has copied the message correctly — or even whether he has copied it at all. Monitor any RTTY QSO and you will see the sender asking "How did you copy, OM?".

AMTOR to the Rescue

AMTOR marked a giant leap forward for RTTY. Credit for this achievement rests squarely with Peter Martinez G3PLX who developed it from the ship-to-shore TOR (Teleprinting Over Radio) defined in ITU CCIR specification 476-4. AMTOR uses a 7-unit code which gives 128 possible combinations, but only those combinations which give 4 Mark pulses ("1" bits) and 3 Space pulses ("0" bits) are used. There are 35 of these and 32 of them are used for direct translation into the standard teletype alphabet (ITU No.2) — the remaining three being used as operational signals.

To beat the random start-stop of conventional RTTY, AMTOR uses synchronous transmission with a bit rate of 100 baud. The receiving station locks into synchronism with the sender, checks that a received character has four "1" bits and the three "0" bits and prints it out if OK. If not, it sends a QR (request) signal to the sender asking him to repeat that character. Each station is identified by a 4-letter SELCAL derived from its callsign. An AMTOR receiving station standing by on a given QRG automatically responds when someone sends its SELCAL. The Sender knows when the receiving station has locked on and the QSO goes ahead.

AMTOR stations found that they could maintain contact and pass traffic even when conditions were poor, with far fewer errors than on RTTY. QRM or QSB only slowed the traffic rate as the receiving station asked for more repeats (ARQ). At the sending end, the message is "echoed back" precisely as the receiving station gets it, so that the first lesson a new AMTOR operator has to learn is that he need no longer ask "How is the copy?". The copy, in fact, is what he sees on his own display or printer.

Despite these major improvements, AMTOR still has some significant shortcomings. Errors still occur when a random 4/3 block is received and the limitation to UPPER CASE is a han-

dicap. If a shift or unshift signal is not received, letters will be printed out as figures and vice versa which can cause confusion. Moreover, two-thirds of the traffic time is used up by ineffective "overheads" in the system so that eventual traffic flow is slower than the rate that could theoretically be sustained even on noisy HF paths.

Further Improvement

The design of PACTOR was started in 1986 by DF4KV and DL6MAA. It aimed at building on AMTOR's good points but eliminating its defects. Some elements of Packet AX.25 have been utilised in modified form to build a superior AMTOR-type system. PACTOR QSOs are carried out in exactly the same way as AMTOR QSOs — in other words, it is a genuine conversation-style mode, with the sender passing the keyboard over to the receiver at the end of his over, and the receiver later passing it back again. But this time, the full callsign and not a SELCAL is used when calling — thus avoiding ambiguities that can arise in choosing SELCALs. PACTOR continues to use a synchronous system but with a cycle time of more than one second compared with AMTOR's 450 ms. The slower "chirp" and the brief ACK signal are recognisably different from AMTOR's briskly repetitive bursts. PACTOR uses a much longer block with a header, 192 message bits and a 16-bit CRC or Cyclic Redundancy Check. On-line data compression using Huffman encoding speeds up traffic flow during text transmission. PACTOR can handle the full ASCII character set up to Decimal 127 and is capable of sending binary with high accuracy.

It uses a clever system of "Memory-ARQ" whereby blocks damaged by QRM or QRN are re-constructed during ARQ repeats. An automatic speed-change mode enables stations to skip into high-speed 200-baud transmission when the path is favourable, dropping back to 100-baud if difficulties are encountered. The end result is a system that is about twice as fast as AMTOR, with equally good weak-signal response and an accuracy that is in essence, 100 percent!

The great virtue of PACTOR is that it is an up-and-running proven system with thousands of users already on the bands. It is hardly likely to be challenged by commercial systems such as CLOVER which use DSP technology demanding a radio frequency stability of 0.10 Hz! To run PACTOR, you need a small PTC controller (10 x 17 x 4 cm) currently marketed by SCS in Germany at around US$420. This can be driven by any computer terminal or electronic typewriter with a RS-232 port. The PTC unit can be simply strapped to provide Low or High Tones with 200 Hz shift. High Tones using FSK and a CW 500 Hz filter is the recommended set-up in which case the customary 170 Hz shift is entirely acceptable. "Listen" mode is mandatory and is, of course, provided, as is FEC transmission. The PTC PACTOR controller can also run AMTOR or RTTY. If the system is standing by in PACTOR mode, it will automatically switch to AMTOR if called by an AMTOR signal.

Each PTC controller has its own mini-mailbox with a capacity of 21,000 bytes which may be accessed by any calling station. This was originally a PACTOR-only facility but the current firmware (Version 2.0) enables AMTOR callers also to use the mini-mailbox. The inclusion of a mini-mailbox in each terminal could be regarded as encouraging station-to-station contacts, and is likely to appeal to those who regard a mailbox-ridden spectrum as somewhat arid landscape.

The PTC controller keeps its own log, which may be interrogated by a distant station. In practice, especially when used with an imaginative and versatile terminal program such as PT.EXE, it is a delight to use. With the full range of keyboard characters at your finger-tips it is more akin to letter-writing — traffic flowing with remarkable speed and with uncanny accuracy.

The PT.EXE terminal program provides split-screen display with on-line help, word out, word wrap, editing, ASCII file transfer, binary data transfer, robot mode with selectable replies, single-key calling for stations on your own compiled list, incoming/outgoing traffic automatically saved to disk in a buffer file, automatic CQ and a host of other features which make PACTOR a dream mode. Small wonder that PACTOR users regard it as the magic successor to AMTOR!

FOOTNOTE:

(1) Current versions of the firmware (Version 2.0), along with the earlier Version 1.32, enable ARQ contacts to be established over the long path. The cycle time is increased to 1.4 seconds and the pause for controls is long enough for ARQ contacts over 40,000 km. There is a slight reduction (about 10%) in traffic throughput.

(2) Orders for the PTC Controller may be sent to: Specialist Communications Systems GmbH, Rontgenstrasse 36 D-6450 Hanau 1, Germany.
Note: Under recent licensing arrangements by SCS the PTC Controller is also being made by: PacComm Packet Radio Systems Inc, 3652 W Cypress Street, Tampa, FL 33607-4916 USA
SCS Germany is negotiating with Kantronics and AEA to enable these companies to include the Pactor mode in their multi-function units. It is understood that they are concerned to ensure that all new PTC controllers follow strictly the SCS Pactor protocol so that the high reputation of the Pactor mode may be safeguarded. The BMK multy software approach apparently has problems and is not yet approved by SCS GmbH.

(3) The PT.EXE terminal program is available for a donation of USD40, along with a formatted disk and self-addressed envelope sent to: Helga Zielke DL6HAX, Im Winkel 13, D-2055 Dassendorf, Germany.

(4) The GPLX AMTOR mailbox has now been adapted to respond to PACTOR callers; software modifications were made by JA3FJ and JA5TX. GPLX PACTOR mailboxes are already in operation at JA5TX, JA3FJ and 9M2CR in the 14 MHz band.

(5) A full technical description of PACTOR and PTC PACTOR Controller is published in QST QEX Issue 116 October 1991.

ar

QRZ!! This is "Ed"

Mal Johnson VK6LC

The following is a short profile of Ed Williams VK6AJR/WB4G/MM/9H3PN when resident at Exmouth Gulf, Western Australia.

Ed is a maritime radio operator and describes the service of amateur radio involving a near shipping crisis when a fire on board caused the ship to become "dead in the water". The support of other amateurs in this event was very interesting. His message is indicative of the present trend to move over to satellite-based communications without having a commercial operator aboard.

Ed's Background

Ed spent 10 years at Exmouth Gulf and worked as a HF technician. He went back to sea two years ago as a commercial radio operator (his past profession). He is very well known in Western Australia, particularly in the north-west region, is a very active SSB/CW operator and home brewer, and took a keen interest in mobile and camping expeditions. Ed was an active member in the North-West Amateur Radio Society, being the custodian of Australia's famous and highest two-metre FM repeater — VK6REX — located on the top of Tower Zero, Exmouth Gulf. In 1984, Ed VK6AJR, VK6ASF and VK6ACT, installed VK6REX on Tower Zero. This repeater was a major link for the distant towns of Port Hedland, Wickham, Dampier and Karratha for communicating with ducting to Perth. Because of its height (396 metres or 1300 feet above ground) it most certainly did cover a large area for mobile stations. VK6REX was taken down two years ago and is presently under renovation and modification. It will be re-installed just out of Exmouth. Ed is a very friendly and hospitable person. He enjoyed helping many amateurs in his area gain their licences and establishing the Exmouth Amateur Radio Club VK6US.

Ed Williams, VK6AJR, WB4GDH/MM in his Maritime Mobile shack.

One of the activities of the club was the Scouting Jamboree on the Air participation. Many amateurs, including myself, had visited Exmouth Gulf and ended up with the hospitality of Ed's fishing and camping techniques at Yardy Creek.

At present, I know of only one active amateur in Exmouth Gulf, and that is Rex Wiggins VK6ARW, who keeps the JOTA going each year and manages the Exmouth Caravan Park. If you ever intend visiting the area, make yourself known to Rex as he is very familiar with all the best DX sites and fishing areas. Rex is very active on Amtor digital modes.

Ed WB4GDH/MM, VK6AJR, 9H3PN is still very active looking for VKs on off-duty hours from his maritime mobile salt mine, so if you hear Ed on the bands, drop in and say hello.

Now, over to Ed for his interesting story.

(Editor's Note: Although this item was submitted over 12 months ago, the message is still relevant today. Apologies for the delay which was caused by extreme pressures for space .. VK3ABP)

"I read with interest the articles in last year's (Dec '90) issue on the problems with the Merchant Marine's Ready Reserve Fleet.

Well, they still have problems with some of them! I am presently the Radio Officer on the SS "Cape Nome" and we have been trying to get home since the end of September.

One successful trip to the Persian Gulf was made at the end of Desert Storm. On the second trip to the Gulf the tailshaft broke about 50 miles south of the Azores. She was towed to Lisbon shipyard where she was worked on for four months. We went on sea trial successfully and were requested to go to Bremerhaven to pick up empty containers bound for the Persian Gulf again! We left Bremerhaven around the second week in October and were about halfway between Sicily and Benghazi when a fire broke out in the port uptake. The fire spread and, finally, the

plant was lost. The emergency diesel was started, but the regulator went bad on it and I could not bring up any of the Marisat or HF gear. By this time the radio room was full of smoke, and the heat from the port uptake was unbearable. (A bar of soap melted in the soap tray in my room). You can imagine what it was like trying to put out the fire, and heat was even worse down in the engine room!

Fortunately, I had my Atlas 210 along, and a 12-volt car battery purchased the last day we were in Germany.

I rigged up a 20-metre vertical dipole on the flying bridge and, within five minutes, contacted 9K2YA (Joseph in Kuwait) who was able to run an emergency phone patch for the captain to the office in Philadelphia. Also standing by on Desert Storm Net was SV1BDC Angelo in Athens.

The office contacted another ship, "Cape Lobos", which was within a few hundred miles of us. The fire was put out successfully that evening and everybody was exhausted! It sure was a strange feeling still to be dead in the water, no power and completely in the dark! The "Cape Lobos" finally got close enough and we rigged the 12-volt battery to the bridge VHF and contacted them on Ch 16.

A tug was called from Malta, and for the next three days, "Cape Lobos" was our relay mainly to MSC in Naples.

The tug arrived two days later and I sent out our routine traffic on 500 kHz using the 40-watt emergency CW transmitter/receiver to 9HD, Malta Radio.

Finally, I would like to add that I hope when the new GMDSS satellite gear is installed on merchant ships around the world they plan to have a radio officer on board just in case something goes wrong!"

ar

WANTED

COVER PHOTOGRAPHS

The Editors are always interested in photographs suitable for use on the cover of Amateur Radio magazine.

Please use recent issues as a guide to suitability.

Mini Equipment Review

[redacted]

The MFJ-945D Mobile Antenna Tuner

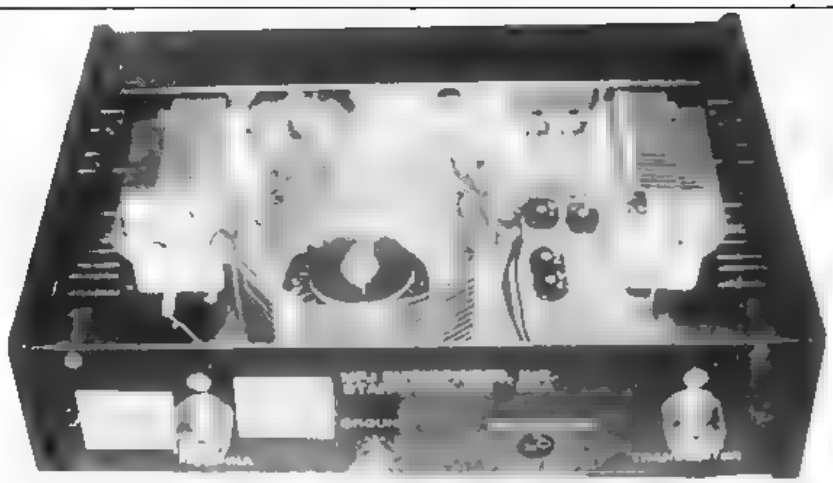
MFJ produces a wide range of excellent antenna tuners. The 945D is typical of the several 300-watt models that Stewart Electronic Components stocks. It is, in fact, the smallest and cheapest of them all, yet it still includes a crossed needle SWR/power meter and 160 to 10-metre coverage. While it's advertised as a "mobile" tuner, it is equally useful in the home station shack.

At only $195 it is probably the best value around. Overall size is a compact 200mm wide, 52mm high and 150mm deep. Weight is just 875 grams. Construction of the case and front panel is metal with plastic end pieces to form the rest of the cabinet. Finish is a low gloss black enamel. There are five front panel controls, transmitter (input) and antenna (output) tuning capacitors, a 12-position inductance selector, a push button to select 300 or 30-watt power range on the meter, and a button to switch on the meter illumination lamp. This requires an external 12-volt DC power source.

The rear panel has SO-239 connectors for RF input and output, plus a 2.5mm audio type socket for the meter illumination power output. There is also an earth connector with a good solid wing nut on it. Another word about the cross needle power meter. With the 300-watt range selected, the reflected side reads 60 watts maximum, and with the 30-watt range the reflected full scale is six watts.

So, what will the MFJ-945D do for you? Firstly it will tune up a random wire antenna and present your transceiver with a 50-ohm load. It will extend the useful range of a narrow band antenna such as a trap vertical on 80 metres. It is also ideal to match anten-

[redacted]



Interior view of the MFJ-945D Mobile Tuner.

nas such as the G5RV on 80 and 40 metres where these usually operate with a high SWR. It should be noted that the 945D does not include a balun, so operation into a balanced line is not possible.

Some of the higher priced MFJ tuners do have a balun built in.

The MFJ-945D on the air

I have given this tuner an extended and very rugged check out. It came along on our 12,000km trip to Darwin and back via the Gulf of Carpentaria. It survived being bounced over terrible roads (in the van, of course), being almost filled with red dust, and didn't miss a beat. At our campsites each night I threw a wire over a suitable tree and got on the air often using frequencies not covered by my mobile whips, such as 30 metres. Results were always excellent, with reliable contacts back to Melbourne, usually a couple of "S" points up on the whip when using 20 metres. At the time, I was unsure of the actual length of the wire. It was just a spare piece in my portable antenna box. On returning home, I checked it out and found it to be just over 80 feet; in other words, a classic W3EDP as described several months ago in Random Radiators. No wonder it worked so well. That's my story, anyhow. The only band the 945D doesn't shine on is 160. The capacitors are too small, and the choice of inductance too limited. It will work on this band, but the matching range is rather limited.

Is there anything I would change on the 945D? Yes, for sure. I would install an insulated terminal in parallel with the output SO-239 to connect a wire antenna. Also, I would like to see a proper DC connector in place of the 2.5mm audio type connector.

The instructions supplied are reasonable. They consist of three pages of A4 size material. There is a circuit included, and they do tell you which side of the DC power connector is positive.

Thanks to Stewart Electronic Components of 44 Stafford Street, Huntingdale, Victoria, for the loan of the MFJ-945D used in our tests. Have a look at the full range of MFJ tuners they stock. I am sure you will find one to suit your needs.

By the way, I might just have to buy a 945D before heading north next year. I am not sure I could get along without it!

Making Simple Circuit Boards

Drew Diamond VK2XU
Rafters Road
Wonga Park Vic 3115.

A simple circuit board production technique which requires no drilling. Components solder directly to tracks and no photographic technique or messy resist is required.

Local and overseas radio/electronics journals periodically show printed circuit "artwork" for projects where the builder has simply etched a board using right-angled copper tracks with rather large pads and runs. The parts are then soldered directly onto the copper pads without need for component holes. The method has several attractive features;

- The amateur can reproduce a project without fancy equipment,
- if lots of ground path and ground-plane is preserved, circuit stability is enhanced,
- any necessary troubleshooting is simplified, as the circuit path is plainly visible to the worker,
- components may be easily replaced without removing the board from the equipment chassis,
- the experimenter can lay out "one off" boards easily,
- with care, the finished result can be quite presentable.

Tools & Materials

Circuit board material — cut to size, roll of wide packing or masking tape, carbon paper, sharp-pointed instrument, retracting type sharp "hobby" knife, perspex ruler, ball point pen, ferric chloride solution, plastic or glass etching container, plastic forceps or tweezers, abrasive pad, circuit board lacquer.

How to Do It

Cover all copper surface(s) with packing tape.

Wrap carbon paper to cover the side to be etched.

Stick the board onto a flat table-top surface, carbon paper upwards.

Use a sharp point to exactly locate a 1:1 copy of the printed circuit artwork pattern over the board- fix in position with tape.

Using a firm pen pressure, trace the pattern onto the board.

Remove the carbon paper to reveal the traced pattern.

Carefully cut along the tracing with a sharp knife.

Remove the narrow tape strips to expose unwanted copper.

Place the board into your ferric chloride solution- pattern upwards. Follow suppliers instructions regarding safety, mixing and disposal of spent solution. The process may be speeded up by placing the etching container into a larger container containing very warm water. Agitate the board periodically. Check often. It should take between 10 and 30 minutes, depending on solution strength, condition and temperature. Use plastic tweezers or forceps to remove the board. Then wash it in running water.

Remove the tapes, revealing the unetched copper tracks.

Polish with an abrasive pad holding the board at the edges to avoid fingerprints, then apply a coat of circuit board lacquer.

Suppliers

(cheapest source first)

Circuit board material; electrical insulating material merchants (eg Menzies Electrical, Melbourne), most electronics parts suppliers (eg Jaycar, Dick Smith, etc).

Ferric chloride; chemical suppliers (eg Selby's) and most electronics suppliers.

Packing or masking tape; paint suppliers, stationers.

Solder-through circuit board lacquer; Jaycar.

Plastic forceps; scientific equipment supplies, photographic suppliers.

Acknowledgments

Garry Newton, VK3DGE- packing tape idea.

Roy Hartkopf, VK3AOH- warm water speed-up.

Further Reading

How to Lay Out RF Circuits, White-G3SEK, Rad Comm Feb/Mar '91.

W1FB's Design Notebook — ARRL.

ar

Build a Packet TNC

Colin MacKinnon VK2DYM
2 Mills Road
Jenkinsen NSW 2161

Over in West Australia a few years g some enterprising amateurs signed and produced a kit for a TNC that is software compatible with the world standard TNC2 and its clones.

Several hundred kits have been sold so far and it makes a great and economical project to get started in packet radio. The kit was designed by Joe Nevin, VK6ZTN, and Laurie Dall, VK6XXX, of the West Australian Digital Communications Association and is called the FLASH TNC, model PAD207 Packet Controller.

The bare circuit board is available for $40.00 and the complete kit costs $150.00, both prices including postage. Orders with a cheque can be sent to:- Mr. J. Nevin VK6ZTN, P.O. Box 97, Cannington, W.A. 6107.

I was most impressed by the design which has added features like a prototype area, provision for battery backup and an external modem, and jumper links to re-configure the operating modes. There is even an option to disable the LED indicators if you want to save power. The standard of components is high with all IC's socketed in machined pin IC sockets instead of flimsy stamped pins, and even a blank EPROM is supplied.

The PC board is double sided and screen printed accurately. I costed the components and found I couldn't buy the parts any cheaper here in Sydney. The instructions are good, and the whole thing went together very easily. You need to be able to solder the IC sockets without bridging across to closely spaced adjacent tracks so you need a very small tip soldering iron and fine solder, and just the usual small tools.

The circuit is quite conventional and can be divided into a) a serial interface with a modem, b) a microprocessor control section, and c) a power supply and timer. For the purposes of my description I assume the TNC will be set for 1200 Bd, for VHF packet operation, and a 1200 baud data rate between the TNC and computer. It can however be configured for different modem baud rates down to 300 Bd, suitable for HF packet operation, and communication rates to the computer from 300 Bd up to 38,400 Bd.

The incoming signal from the receiver is input straight into a 7910 modem IC, such as is so often used in packet and telephone modems. The 7910 data signal output is buffered and sent to a Z80 SIO, which transmits the data to the computer in standard DCE RS-232 serial format.

On transmit the incoming data from the computer is sent to the SIO which clocks it out to the 7910 modem where it is converted to the correct modulation frequencies. Transmit level can be adjusted with a trimmer potentiometer. A set of jumper links allows the 7910 to be configured for various modes, but would normally be set for CCITT V.23 back channel loop, which suits the 1200 Bd packet frequencies.

A PTT output is also activated on transmit, using a V10LM switching FET. The FET can handle 15 volts and only a few milliamps when on, which will suit most modern transceivers, but if higher voltage and current is needed to activate the rig's PTT, a small relay will have to be fitted in the line. The interface circuit includes LED indicators for PWR (power on), MODulation, CONnected, STAtus, PTT and DCD (data carrier detect).

The microprocessor is a Z80 driven at about 2.5 MHz by a clock with a crystal on the common frequency of 4.9152 MHz. There is a 32K static CMOS RAM (mine was supplied with a 51256 RAM) and a 32K EPROM to provide the program for the Z80 and TNC functions.

A socket and jumper link is provided to allow for the option of two 16K RAM IC's, and other links to vary the terminal bit rate and modem bit rate. The speed at which the SIO and computer communicate can be set from 300 up to 38,400 baud with these links, whilst the 7910 can be set for baud rates from 300 up to its limit of 1200 Bd, via another set of links.

The power circuit requires a 12 volt DC input and has a reverse voltage protection diode, a 5 volt regulator, filtering and provision for a battery backup. A 555 IC is used to generate -12 volts and -5 volts. The 7805 regulator has a finned heat sink which I had to bend judiciously to clear surrounding components.

Connections to the outside world are via ribbon cable and insulation displacement connectors which are supplied, but as I am running my TNC with a 9600 Bd modem (another project) I used thin shielded cable for the Tx and Rx audio connections.

The instruction manual is detailed, with a complete component check list and a logical assembly procedure as well as troubleshooting hints and jumper configuration options. I did notice that the identification numbers of some capacitors printed on the PC board had been obliterated when the board was drilled, so it is necessary to refer to the PC board layout in the instructions.

A case is not supplied and needs to be at least 180mm long x 110mm wide x 40mm high, preferably metal to reduce the potential for RF feedthrough problems, although I had no problem with the uncased TNC sitting on top of my 2 meter rig. I drilled the front panel of my case (from my junk box) for the LEDS and for an On/Off switch, and filed the bottom edge of the rear panel a little to clear the 3 ribbon cables, and my shielded leads.

Although a 27C256 32K EPROM is supplied, it needs to be programmed, with KISS 1.1.8a or an alternative program. If you can't find a local packet operator with a suitable operating program and access to an EPROM burner, AAPRA at 59 Westbrook Ave., Wahroonga NSW 2076 can supply a

programmed EPROM containing KISS 4 and PMS 3.0 (private mail service) at a cost of $25 including postage, and perhaps other sources are available.

In summary, this is a good, high quality project for getting started on packet. By the time you buy a case, connectors for your transceiver and computer, and perhaps a programmed EPROM, the total cost should still be less than $200.

Technical Correspondence

The Path of Progress

Pervasive technology — a most appropriate description, in this electronic age, of the "survivors" that have passed into general circulation. The questions asked cover a wide field. If an analysis is made of each separate decade in this century, it is like a series of radio "short stories". For the past two decades the equipment market has been driven by the single-mindedness of Japanese industry. The engineering characteristics of this nation are brilliant development, meticulous construction, optimum electrical and physical size and a flair for attractive "gadgetry". This has provided very sophisticated "operator" equipment, at very attractive prices, on the world market, and in this respect the cost-effectiveness is unchallenged.

Much of the spectrum of radio equipment is nearing the technical end-point in development, and many "improvements" are, in fact, variations on a theme, dictated by the designer's attitude, economy or the actual operating location. Amateurs can suit their own particular situation, but there are limits. The test equipment necessary is often beyond their expertise and purse; what then? A necessary re-assessment of the "intent", was it to produce a particular piece of electronic gear or to achieve some operational need? If the latter, then the hunt is on for an alternative method, and experimental technology comes into its own.

Should commercial gear have more access points for expanding and exploiting the technology within the "box"? Too jolly right it should! It would not be possible to have 100 per cent "technical exposure"; any unit is a series of building blocks, and what is necessary is the ability to intervene between them without compromising the safety or integrity of the equipment, to increase the versatility or to add a specific characteristic to suit an operational test or need. Whether an individual operator makes none or 100 changes is his or her choice. Whether they do them at the start of their involvement, during or after 40 years, is one of the attractions of amateur radio — it is amateur. Leave all the avenues open to be enjoyed.

Robert McGregor VK3XZ
2 Wiltshire Drive
Somerville 3912

Try This

Steve J Mahony VK5AIM
18 Kenrich Rd
Elizabeth Downs SA 5113

Amateur Radio Security

Breaking-in to domestic residences is increasing. The amateur shack can easily become a target for these villains, so the amateur should try to make his or her shack and equipment secure.

In my work at a TAFE college, I have recently been involved in making electronic equipment secure, ie laptop computers, cassette recorders and similar easily portable (read stealable) equipment.

This has been achieved with small lightweight stainless steel plastic-coated cables with special lugs attached each end. This cable is passed through lugs and/or saddle-like fixtures attached to the equipment, tables, benches etc. A padlock is then passed through the eye end of the cable, making it difficult — if not impossible — to remove the cable and free the equipment.

This system has stopped the "quick snatch" opportunist thief, as I believe someone with the tools and time could cut through the fittings.

I have linked some of my valuable equipment, and although it is a bit inconvenient to disconnect and move a piece of equipment for testing etc, it is nice to know the gear is secure.

The stainless steel cable used is only about 4mm in diameter, so it's no bigger than the earth wire you should have linking your gear.

This type of securing system is available from several sources. The one I used is called Cabelok LTK-1.0, available from Cecil E Mayo Pty Ltd in each state. A complete kit is $17-95. Padlock extra.

The same system could be used on your TV/VCR, Hi-Fi etc.

Time and money spent on something like this may save you a visit from the hamburglar! Not the variety from the big yellow M store!

Aerial Wires and Spreaders

Robert R McGregor VK3XZ
2 Wiltshire Drive
Somerville Vic 3912

An excellent wire for the long term or span is the copper-clad nickel/steel wire especially made for the job. It is not easy to work with, is expensive, and probably not readily available. Next is a single-strand copper conductor, 1 to 2 mm, which is easy to do anything with, but liable to stretch in long spans and subject to fatigue failure due to flexing in the weather. Multi-strand wire is probably the best compromise. One old imperial 7/029 or in metric 7/0.75 is good all round as it can be used in long spans and tensioned up to reduce excessive sag in 80 m dipoles. For rhombics a 3 mm galvanised wire will suffice and it can be pulled up hard. Additional losses are small and balanced by gain at the hip pocket.

The spreaders for my original Zepp were half-inch (12 mm) hardwood curtain pole, drilled and then soaked in paraffin wax. It is essential to only melt the wax and never boil it, as this destroys its insulating properties. A simple jig to hold the rod whilst drilling will save time, temper and drill bits. Onto a piece of two-inch/50 mm stock long enough for two spreaders nail, glue or staple two pieces of half-inch/12 mm quad with the inner edges adjacent. This is the V block. Mark off the rod. Feed in the first section. Clamp it and drill the holes for the tie wires. Move the rod and repeat until there are enough spreaders. Start again and drill between the two holes already there with a larger size to suit the gauge of feeder wire. Third time through, and now use a tenon or hack saw to halve the larger holes. The spreaders are ready.

I have also used a 10/12 mm grey plastic tubing and no wax. The application of a triangular or rat tail file will customise the end grooves to any feeder changes. For three wire feeders, drill an additional central hole to thread the third wire, a tie every second or third spreader will keep it from sagging. Why three wires? That's another story, later.

ar

Try This

George Cranby VK3QI
PO Box 22, Woodend 3442

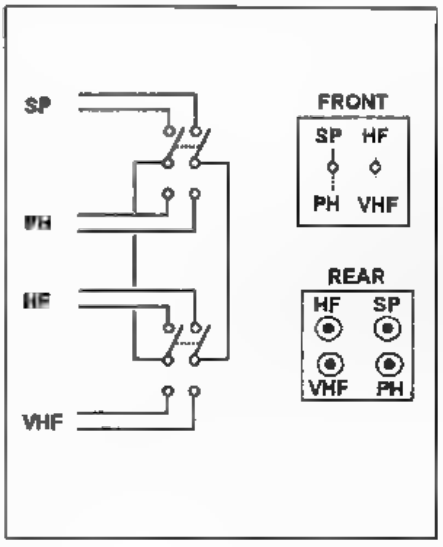
Speaker and Headphones Combiner

This device enables the use of either one external speaker or one set of headphones for either HF or VHF while both transceivers are operative. It uses the external speaker or headphone sockets of the respective transceivers.

In the SP position, either of the transceivers can be heard on the speaker without touching the volume control of the other one. In the PH position, reception is transferred to the headphones.

With a slight and obvious modification, the headphones can be left connected at all times so the operator can listen on the phones and visitors can hear the speaker. I use this method because I am somewhat hard of hearing.

This device has replaced an earlier one which was published on page 23 of the April 1987 issue of AR.



The Adcock Finder for 10 Metres

Ian Berwick VK3ALZ

Pirates and intruders are a common occurrence on our bands. 10 metres is particularly afflicted. Rather than just sit and complain Ian VK3ALZ did something about it. He built a direction finder to find out where the intruders were. This is Ian's Adcock Direction Finder.

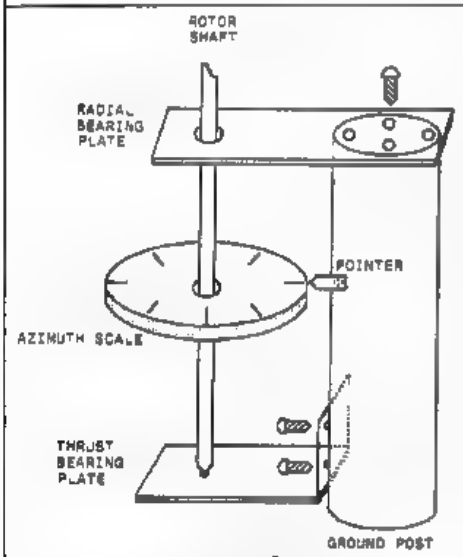


Fig 1 Rotator System

The Adcock Finder for 10 Metres

The drawings should be self explanatory as the theory of the Adcock finder is covered in the ARRL Antenna Handbook and any text on radio direction finding such as Wireless Direction Finding by R Keen. The important thing to remember is that the bearings obtained can be no better than the precision with which the finder is constructed. There is no room for sloppy mechanical work. In operation the listener sits next to the ground post and manually rotates the finder shaft until the aural null is obtained. It is best to wear headphones when nulling the signal. Be wary of signals such as ionospheric forward or backscatter signals. These give vastly erroneous bearings. Also make sure you are not on a reciprocal bearing. Calibration consists of setting the angular position of the azimuth scale to coincide with the actual bearing in degrees true. Do not use magnetic for bearings. All that is needed is the bearing of a radio point source. When the finder is nulled on the signal undo the grub screw and rotate the pulley so that the scale reading is the same as the known bearing and then re-tighten the grub screw. The scale is now aligned.

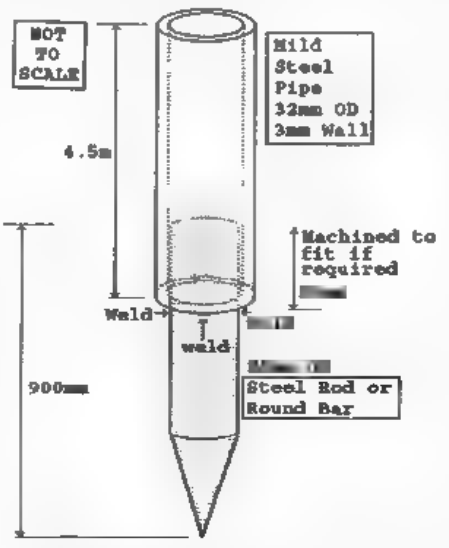


Fig 2 Complete Rotor Shaft Assembly

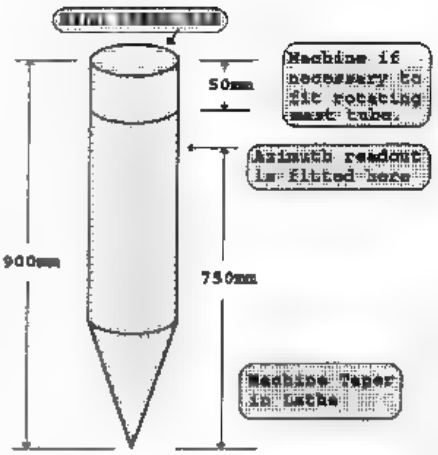


Fig 3 Thrust Bearing Shaft.

If possible select steel rod to fit the end of the pipe (Fig 2). Otherwise machine the steel rod to fit.

Make sure the Thrust Bearing Shaft (Fig 3) bar is straight.

The Radial Bearing (Fig 5) is attached to the top of the Ground Post with coach screws. Use 4 off 50 mm x 6mm dia or 1/4 inch dia.

The Ground Post (Fig 6) should be strong. I used a treated Radiata Pine post 160mm diameter. These come in standard lengths and sizes. Select appropriately. The post should be set in concrete and set vertical with a plumb bob or level before the concrete sets.

In the Azimuth Readout Assembly (Fig 7), glue a 150mm diameter plastic protractor to the top surface with contact cement. Make sure the protractor is properly centred. When the glue has set mount the assembly on the lathe. Make sure it is centred properly on the headstock attachment — chuck etc. Then bore the assembly for the shaft. 25 mm Inside Diameter. 150mm plastic protractors are available at any drawing/drafting supplier. The Radial Bearing is attached to the top of the ground post with coach screws Make sure the top is flat and level. The thrust bearing is attached to the post near ground level. Make sure the post is flat and vertical at this point Now to the Rf parts.

The Adcock Antenna elements (Fig 8) are 12.5mm tube. Standard Lengths should be close or you can buy tubing cut to length for a modest charge.

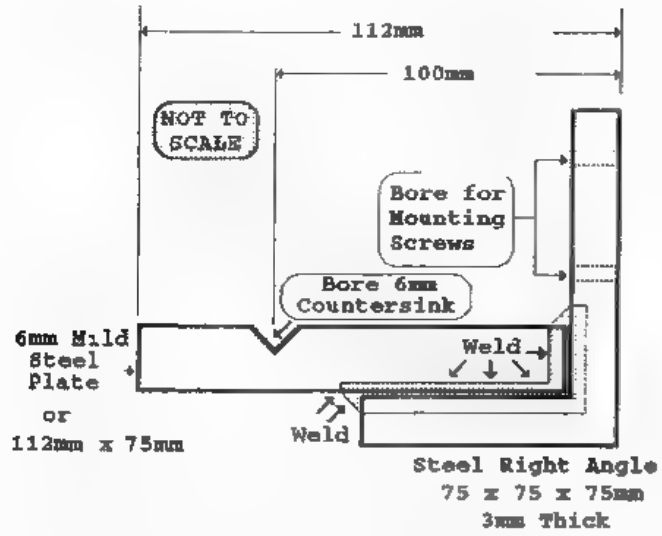


Fig 4 Thrust Bearing Plate Assembly (Elevation)

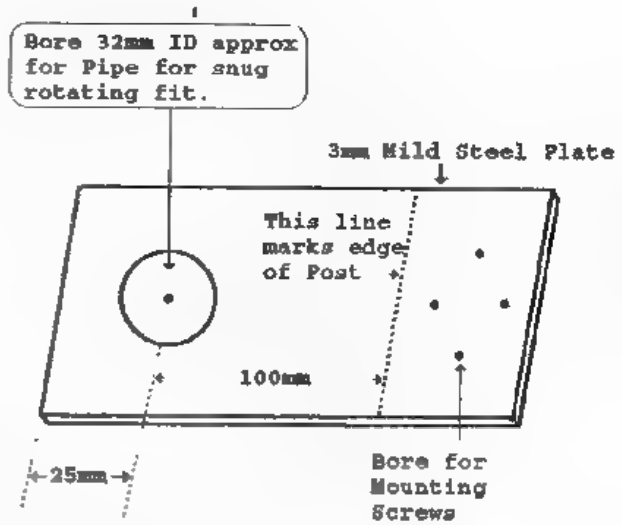


Fig 5 Radial Bearing

In the RF Coupler or Tuner, (Fig 9), the coil is 7 turns wound on 50mm ID. Wire is 12 B&S or 2mm approx bare copper or similar. The link is 2 turns 25mm diameter of the same wire.The link is inside the main coil at the centre. Select taps for best signal. Make sure balance is maintained. Refer to the ARRL Antenna Handbook.

The Antenna Mounting Frame (Fig 11) elements are attached to the frame with plastic tape.

Materials Required

Mild Steel Pipe 32mm OD 3mm wall 4.5m long

Mild Steel Bar or Rod 25mm OD 900mm long

Mild Steel Right Angle 75mm x 75mm x 75mm x 3mm thick

Mild Steel Plate 112mm x 75mm x 6mm thick

Mild Steel Plate 220mm x 75mm x 3mm thick

Radiata Pine 2.4m x 42mm x 19mm 2 off

Radiata Pine 900mm x 42mm x 19mm 2 off

Post Treated Radiata Pine or similar 125mm-150mm OD

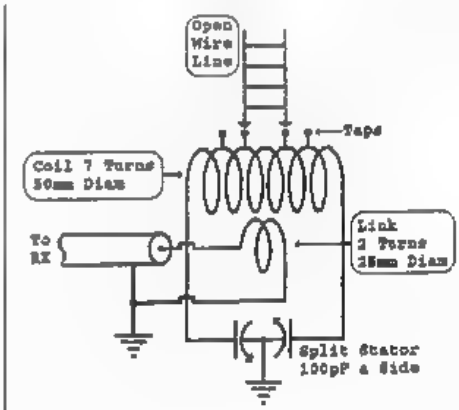


Fig 9 RF Coupler or Tuner

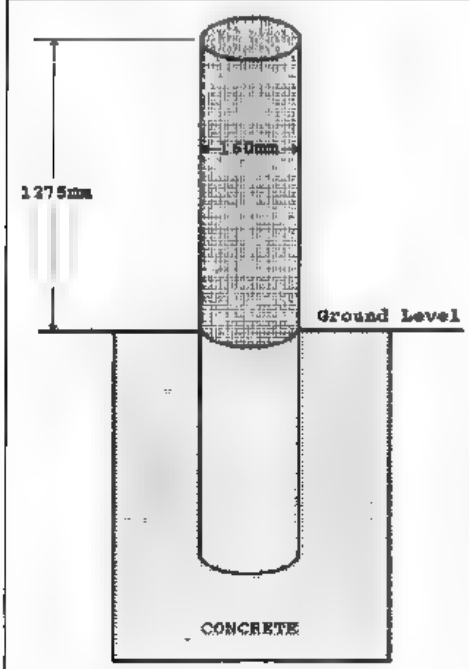


Fig 6 Ground Post

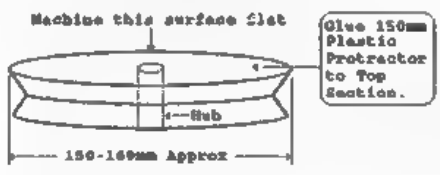


Fig 7 Azimuth Readout Assembly.

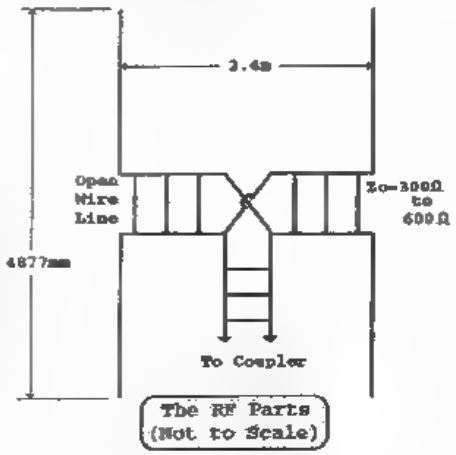


Fig 8 Adcock Antenna

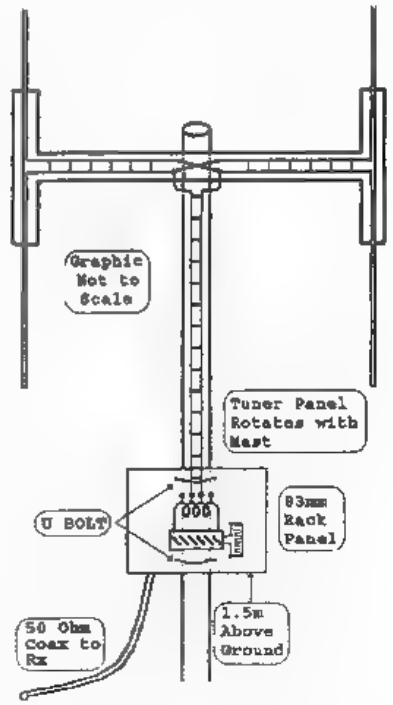


Fig 10 Arrangement of Antenna and Tuner

Coach Bolts 25mm x 6mm or 1/4 inch 4 off

Coach Bolts 50mm x 6mm or 1/4 inch 4 off

Coach Screws 50mm x 6mm or 1/4 inch 8 off

Split Stator Capacitor 50-100pF a side

Standard Rack Panel 19 inch or 483mm or similar

SO239 Panel socket

All quantities 1 off except where stated.

Tech Editors Note

Metric conversion carried out by the Tech Editor. Ian VK3ALZ has imperial size machine tools. Many sizes have near equivalents. Screws and coach bolts have split personality being sold as metric lengths but using whitworth imperial sizes. The important point with this project is to get smooth rotation with no slop. Electrical symmetry is important to achieve good performance.

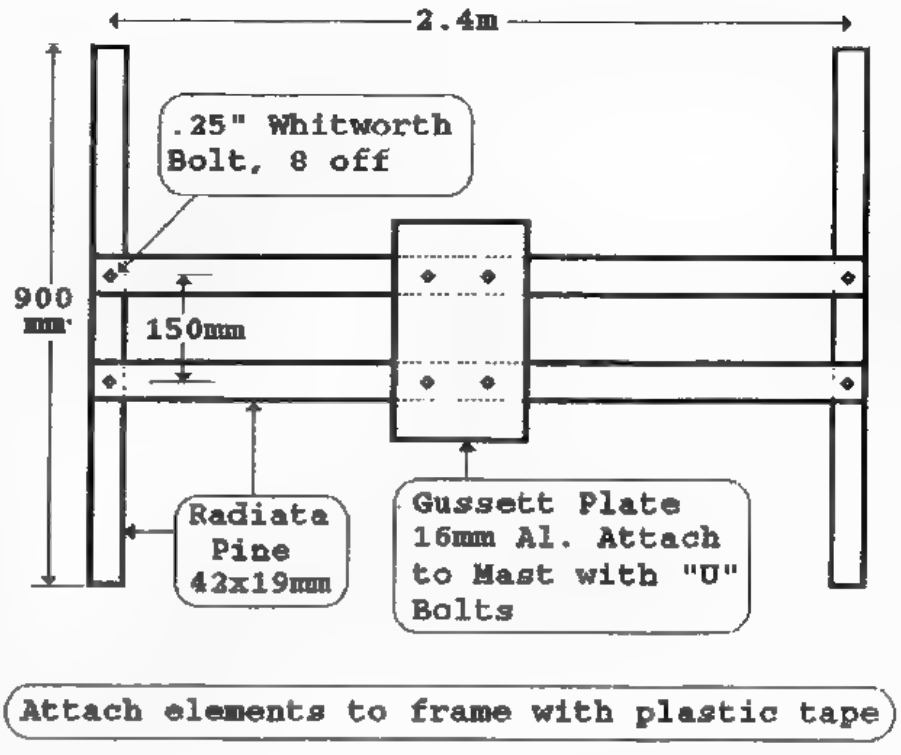


Fig 11 Antenna Mounting Frame

EMC Report

Hans F Ruckert VK2AOU
25 Berrille Rd
Beverly Hills 2209

Telephone susceptibility

1.1 It has been reported that about 300 "modern" telephones had to be replaced by older ones again, because they had to function in several office block buildings near a high power TV transmitter. These telephones had no shielding or filtering of cables, but they contained a variety of semiconductors, which rectified the unwanted signals, having nonlinear properties.

1.2 QST October 1992 published on page 67-69 very detailed information on "telephone interference". If we are not permitted to install bypass capacitors, and if the Telecom organisation is not willing or able to supply a non-susceptible phone, we can only use a common mode ferrite choke by winding the telephone cable through a large ferrite core, using about 10 turns to form a toroid coil where the cable enters the phone. This step could be sufficient if the telephone cable runs underground and not along the power line masts, where a substantial rf voltage may be picked up from our beam antennas.

Powerline RF interference sniffer

2.1 QST September 1992 describes the often experienced problem of rf noise emitted by powerline installations, and a "sniffer" used to locate the source of the interference. The acoustic receiver used by the electricity supplying authority is often not sensitive enough. A portable transistor receiver, especially one with the long wave range 130-330kHz, as used in Europe, can be used for direction finding, having a ferrite antenna built in, and is far more sensitive. One can usually find the general direction from which the noise comes with the shortwave beam antenna. Each rain shower stops the interference, which comes gradually back during the next three days. Rain static is a different story. The engineers from the power authority are usually very co-operative, but they may not have the time to attend, when the conditions are worst. One can see the characteristic interference pattern on a receiver monitor scope. The power poles are all numbered, and the engineers are grateful if we do some preliminary work by identifying the pole with the strongest noise, because in the case of a cracked insulator, a bigger problem could arise for them. The sniffer described in QST operates a receiver at 130MHz, using a three-element beam. The author W3AZ found that at VHF the interference source could be found more precisely.

2.2 QST August 1992, page 49, discussed the question of whether or not a new RF-lightbulb, patented by the "Diable Research Corporation", may cause interference. These highly efficient lightbulbs operate at 13.56MHz. The manufacturer K6KBE says that they are concerned not to cause interference.

3.1 Electro Magnetic Compatibility Law in force!

DL-QTC 12/1992. This law came in force on 13 November 1992 in Germany, and the EMC standards are those which apply to the countries of the European Economic Community. The authorities are to carry out spot tests per manufactured or imported batch of equipment to see that the EMC standards have been met before they grant the CE approval sign by the Federal Office for Post and Communication. Manufacturers and users may be liable for the cost of testing the equipment which is without the CE sign, or when the EMC standards of immunity are not met. Each type of electrical/electronic equipment must be sufficiently immune to unwanted effects (reception etc) of specified signal levels. Customers are therefore asked to check whether the equipment they intend to purchase carries the CE sign. We can only hope it will no longer be economical to produce, sell and import appliances which may be dumped on customers of countries which do not insist on these EMC standards. These EEC EMC standards are better than nothing, but they are not as effective as those applicable in Germany so far, which were developed with strong input by radio amateur EMC experts. It was found, on the other hand, that some manufacturers have been able with economic production methods to achieve EMC properties which are even better than those recommended by radio amateurs. This shows it can be done. It is hoped we in VK-land obtain also the benefit of the EMC efforts, which were carried out in DL-land and its neighbours during the past 20 years.

3.2 RF radiation and the environment

CQ-DL 12/1992 reports the formation of the Research Association Radiation (Funk) comprising representatives from science, commerce, administration, news media and the DARC. The aim of the association is to expand knowledge, to compile and publish the facts on RF radiation and its influence on humans and the environment. As in other areas, here too many wrong concepts are published and sensations are invented under the heading of "electro-smog". The Federal Ministry for Post and Communication met on 2 November 1992 with experts from 17 amateur radio organisations (like Dr Horst Ellering DL9MH, Prof Dr Jodi Elbers DJ3XV etc) to discuss RF radiation and the environment questions. We can claim the fact that RF radiation affects the environment less, the higher our amateur radio antennas are permitted to be installed. **ar**

Working Melbourne from Canberra on 1296MHz

Christopher Davis VK1DO and Geoff Rozenberg VK1OO

Why would anyone in their right mind be interested in 1296MHz? There are only a handful of operators equipped for the band in each capital city, and a few other diehards scattered around. Well, read on, there is enormous interest and reward for efforts on 1296.

I suppose the great attraction to those of us who love antenna experimentation and reaping the benefits of our efforts is that 1296 is the first amateur band where a practically transportable parabolic dish exhibits some monstrous gain. The sort of gain obtainable normally only with a collection of long yagis and associated matching systems.

Having "done" the summer field day with a skeleton slot array on 1296 and being frustrated by a near contact into Wangaratta with Phillip VK3ELV, we were determined to make a better effort for the John Moyle field day, concentrating principally on VHF and UHF. Many discussions and erudite philosophising took place in relation to a better antenna for 1296. Unfortunately, the discussions were reaching lots of agreement, but not resulting in much construction.

The field day approached, and efforts were directed into assisting in equipping another station manned by Rob VK1KRA and Andrew VK1DA who had offered to go into the field elsewhere and increase activity from a site at least 50km distant. This effort was well directed.

However, with minimal spare time, the thought of seriously building four precision yagis and matching systems for 1296 became impossible. Dick VK1ZAH had mentioned some months

before that he had a commercial dish, ex 4GHz satellite, without feed or mounting system, to which we were welcome. With only two days to go, the dish suddenly looked like a more feasible challenge. Dick organised access to the dish which had ended up carefully stored at Tom's VK1BUD QTH. The dish was carefully loaded onto the ute with some additional advice and enthusiastic encouragement from Tom, and we returned to the workshop to scratch our heads.

We all understand why a parabolic dish works, but how do you squirt the power into it? This was Thursday night. With only a day to go, and commitments remaining on the Thursday evening, we both agreed to return to the challenge the next morning after reading every chapter in every book which related to dishes and how to feed them.

Well, either great minds think alike, or idiots follow the same path, but our independent reading reached the same conclusions. The profile of the dish was such that typical "coffee can" feeds did not suit this dish. Many pots of tea later, we agreed that a simple dipole with a disc reflector behind it ought to work. That is technical terminology for a piece of PVC pipe with brass dipole elements mounted on the lid of an Arnott's biscuit tin lid. Other brand biscuit tin lids might work, although the results could be crumby!

Assembly of the appropriate baby dipole with a length of 9913 coax feeding it up the PVC tube were found to work according to a field strength meter in the shack. *Care was taken to point the dipole and disc reflector away from our eyes.*

The modified SWR bridge acting as a field strength meter allowed us to observe all those textbook descriptions of how a dipole and reflector behave. The PVC tube connection to the lid was left firm but adjustable to allow for experimentation in spacing when mounted on the dish. Much of the day was then spent creating a feed mount on three aluminium legs to place the feed at the focal point suggested by our calculations. As well, a system of brackets was engineered to hold the dish without stressing its spun aluminium structure while allowing installation of a rotator.

By about three in the afternoon the whole affair was rigged up in the back

Field Day site for VK1WI showing 1296 MHz dish, 432 MHz and 144 MHz beams.

of Geoff's ute making the front yard look like an outside broadcasting unit. The 1296 MHz receiver was fetched, and the beacon was tuned in. The signal was weak, but copyable. The moment of truth arrived as we turned the rotator. The signal remained consistently weak as the dish turned 180 degrees to point at the local beacon. Suddenly, almost before the rotator could be stopped, the signal went to strength seven and disappeared. Judicious use of rotator control taught us how to allow for inertia and momentum in looking for the obviously narrow dish beamwidth of around nine degrees or so. A quick check with the SWR bridge suggested resonance around 1230MHz.

After carefully balanced pruning, the whole affair came up to 1296 with the removal of around 3mm on each leg of the baby dipole feed. There was little other testing available to us. Out to the field on Saturday and cross our fingers!

The field station went together smoothly having been regularly rehearsed. The contest got underway with a good range of contacts on 144 and a limited number on 432; however, no sign of even a local on 1296. Our sister station operating on Mt Ginini had flamed out with no 1296 working, and problems on SSB operation on 432. So we crossed our fingers and waited.

At 0750z, Arie VK3AMZ called me on 144.1 with a strength nine signal and exchanged numbers. He then enquired what bands we were running. When he heard we had 1296 he asked us to run a carrier as there was an aircraft in progress right then, which he hoped would enhance the path. His initial attempt to hear us on 1296 was confusing, as our signal peaked strength seven leading him to believe it was a local.

Via 144, Arie then offered to run carrier to allow us to peak the dish, the actual correct heading of which we were only moderately confident. Geoff toggled the controls and obtained a worthwhile gain. I told Arie we were about to transmit on phone. Geoff called him and exchanged reports by 0756z. I then offered to go on CW simply for the exercise. By this time the path was gone. Attempts on 432 were unsuccessful at this time, although 144MHz remained solid, probably via a tropo path.

Another contact with Arie VK3AMZ took place on 1296 at 0125z, with similar results. To give you an idea of how dramatically conditions are able to vary, it took 70 minutes on the Sunday morning to work Lyell VK2BE on 1296. His signal is often strength seven to nine here in Canberra Two hours were spent with Roger VK3XRS attempting a contact on the Sunday morning; however, even 144MHz was weak at times, with the path on all bands limited to tropo, it seemed.

The callsign used for this first Canberra-to-Melbourne contact was VK1WI; the operator was Geoff VK1CO. The distance from our field station at Kowen Forest to VK3AMZ in Werribee is 456km, which I believe would be a record for VK1. **ar**

Satellite Gateways

[redacted]

Current, Plus Future Possibilities

The current satellite gateway system serves as an extension of the terrestrial packet bulletin board system (packet BBS). Terrestrial BBS traffic is routed into and out of the gateway. The gateway in turn uploads and downloads the traffic to or from the amateur satellites. The BBS traffic is thus available to similar gateway stations, around the world or interstate, also for two-way exchange with their local terrestrial network. This concept is well accepted and understood by those amateurs who are following current activities in these fields. These gateway stations do a great service in passing BBS traffic over long distances in a minimal time.

Some time ago I had a discussion with a local amateur who was interested in participating in some digital satellite activities. I thought this should really be possible and without him having to set up a satellite-equipped station. Enter a different concept of satellite gateways. One in which a local packet user may directly utilise some of the amateur satellite's functions via a suitably equipped gateway station.

Following is one of the early files describing some of my aims:

This idea of an interactive/real time satellite gateway is offered, at this stage, as a concept, rather than a fully functional system. Others may wish to:

1) implement some of my unfinished facilities,
2) improve on those already implemented;
3) expand the basic concept.

It is not designed to compete with existing gateways, but to offer an alternative, initially experimental, access to some amateur satellites.

It should allow:

1) amateurs to experience some aspects of digital satellite operation with them needing no more equipment than terrestrial packet facilities;
2) those who, for various reasons, cannot install the necessary equipment to work a satellite directly;
3) a low-cost/low-commitment introduction to digital satellites.

The initial aims were to:

a) provide a directory . . . the list of files (messages, bulletins, images, logs etc) currently available from the satellite in question;
b) to be able to read files;
c) to be able to upload files.

Naturally what I thought would be a relatively simple exercise became more and more complex as I delved into the problem. Initially, I could see that some sort of terrestrial BBS could provide a suitable interface between a user and this type of gateway. I decided on the F6FBB BBS as this seemed the most versatile. Setting up that BBS was no small task in itself. Later, I did get to the state of implementing some of the above gateway requirements, albeit, in many respects, rather crudely.

A couple of months ago, in looking through some of the files appearing on UO-22, I noticed that John WA0PTV had put up a suite of programs for beta testing. These programs were designed to, as well as run a normal gateway, do essentially what I had been trying to achieve. I have slowly integrated his work into my system and, at this stage, the whole concept looks quite interesting.

The purpose of these notes is to inform others of these activities. Possibly, the near future will see more of this type of gateway, which John calls a gateway node, being installed by interested amateurs.

The present "state of the art" would allow:

a) a current satellite directory to be circulated as a bulletin or sent to an interested user;
b) the user can request files of interest from that directory. If the gateway station has already downloaded that file, it is immediately available. If the file has not been downloaded, it will be marked for downloading during the next pass in which the gateway participates. The user is sent the file as a BBS message when it is available, or in the case of a binary file, advised, via a message, to use a binary transfer protocol;
c) the user may upload a file;
d) once the system recognises a user, satellite traffic for that user will be automatically downloaded for that user.

All the above is capable of automatic implementation. I have not achieved this as yet! Users, just one or two digipeaters away, should be able to participate. However, the usual terrestrial packet common sense regarding files and binary transfers via a number of digipeaters needs to be considered.

Should sufficient interest be shown, perhaps where more appropriate, that is in larger population centres, some development along these lines may be possible:

a) a dedicated local area network (LAN) could be established for these gateway operations;
b) these LANs could use higher speeds and exist on UHF bands;
c) or, possibly, these LANs could be part of another specialised network and the gateway operations co-existing with other network activities.

Further in the future, we may see some "real time" operation. One can envisage the gateway station established to allow simultaneous traffic between a number of local users and the satellite in question. I feel sure that many other concepts will emerge, and an exciting future lies ahead.

Footnote. Most of the above was covered in a talk given at the Central Queensland Digital Group in Rockhampton on 12 September 1992.

ar

A VHF and UHF Antenna Combiner for Mobile Use

Ian Keenan VK3AYK
6 Pretoria Street
Caulfield South, Vic 3162

These days the use of dual band mobile radios is becoming more popular, due to the flexibility and comparative cost savings by having 2 metres and 70 cm in one "Black Box".

Many of these units have two antenna connectors on the rear of the radio, one for each band. Unless you want your car to resemble a spiny ant-eater, some form of antenna combining is a good idea! On a more serious note, desensitisation or some other form of interaction may become a problem due to the limited horizontal spacing that can be physically achieved between two operating antennas on a vehicle.

To overcome this problem, usually one dual band antenna is employed on the roof of the car. This is fed by coaxial cable, the other end is connected to the antenna combiner at the transceiver.

Commercially made antenna combiners or duplexers are available from the usual amateur radio retailers, but the one described here is much cheaper and will match the performance of these providing there is no significant departure from the construction as described.

Description

The function of the antenna combiner is to provide rejection or isolation of the opposite band in use. This is obtained by developing a high impedance path looking into the opposite ends or ports, ie the VHF and UHF sides of the combiner. This isolation is required to prevent respective transmitters on each band doing damage to the associated receiver of the other band. After all, we want to work dual band without blowing up our receiver front ends!

However, at the same time, a low insertion loss or path is required for either band to the antenna terminal of the combiner.

Looking at the circuit (Figure 1), the operation of the combiner is quite straight forward. There are two discrete filters, one for each band of operation. The outputs of each filter are connected in parallel for connection to the antenna.

Filter 1 is a low pass filter, allowing VHF signals to pass almost unobstructed to the antenna, but providing a high impedance path for any UHF signal.

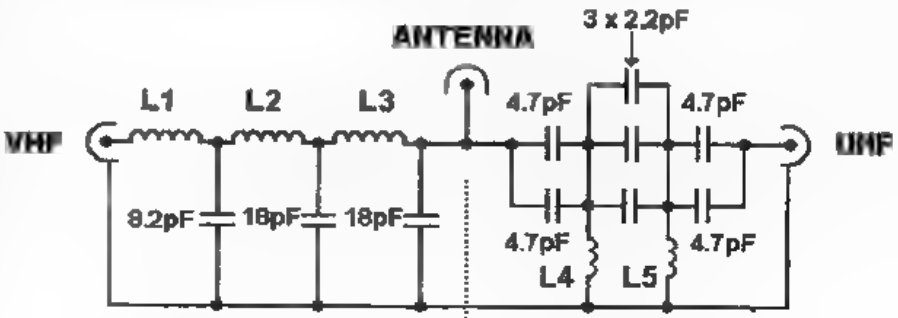
For UHF, filter 2 is a high pass type allowing UHF signals to pass but inhibiting the passage of any VHF energy.

Construction

The device was built into a die cast box approximately 1.5 x 1.25 x 2 inches in size. A small piece of printed circuit board was cut to fit neatly into the bottom of the box. This was then bolted to the bottom of the box. The screw heads were counter-sunk into the box. (I used four 4BA brass nuts and bolts.) The nuts, after being tightened, were then soldered to the circuit board to provide a good electrical earth.

The capacitors and inductors are supported entirely by their own leads. They are soldered directly to each other and to the circuit board where required — no standoffs are used. The inductors should be mounted at right angles to each other. This will significantly reduce mutual coupling and provide greater isolation. I found no shielding partitions were necessary provided this was done. The photograph gives a general idea of the layout and placement of the components.

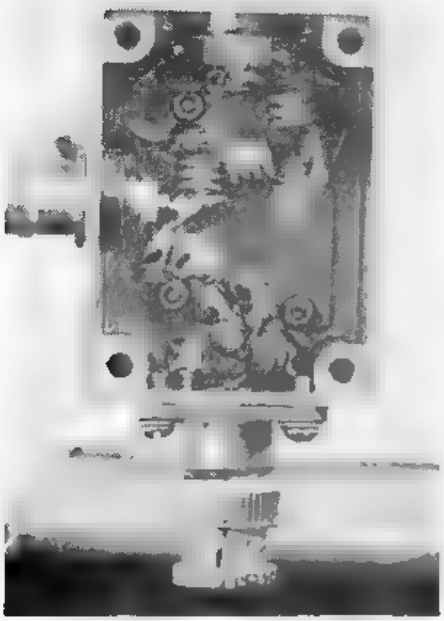
Component details are as indicated in the circuit. For the coils, 18 gauge



Filter 1
L1, L2, L3 - 3.5 turns wound on 5 mm drill bit. Coil length 7 mm.

Filter 2
L4 & L5 - 1 turn wound on 4 mm drill bit. Coil length 5 mm.

Figure 1



The VK3AYK VHF/UHF Antenna Combiner

tinned copper wire was used. All coils are close wound — with sufficient space so adjacent turns do not touch.

It is extremely important that 600 Volt NPO disc ceramic capacitors are used. All component lead lengths (inductors and capacitors) are kept as short as practicable — in effect, just long enough for the components to touch so they can be soldered. Remember, this is a VHF/UHF circuit!

I preferred to use chassis mounted coaxial connectors. This facilitates an easier and more compact unit, as the start of each filter element for both bands can be soldered to the rear of the coax connector. Coaxial cable flying leads could be used (as do the commercial combiners) with suitable holes drilled in the box. The cable braid should be neatly trimmed and tinned, then soldered to the circuit board with suitable coax connectors at the other end for connection to the transceiver. Small standoffs should be used inside the box to support the coax centre conductor where it is attached to the filter components. Keep the leads short!

Testing

Having assembled the unit, now comes the most important part — the testing. On no account should you connect it direct to the radio and try it blind, you made have made a wiring error! Check the unit and observe that all the wiring is correct. If you have access to a sweep generator, operation can easily be verified! The rest of us have to use more mundane methods.

Connect a non reactive 50 watt dummy load to the VHF port at the combiner. Connect a sensitive UHF/VHF power meter terminated in a 50 ohm load to the UHF port. Then connect a 146 MHz power source (transceiver) to the antenna connector of the combiner. Key the transmitter on and read the power on the meter. It should be at least 40 dB down on the VHF power level (ie 40 dB is a power ratio of 10,000 to 1). Therefore, for 50 watts at the antenna port, there should be in the vicinity of 5 milliwatts or less observed on the power meter. If you feel it is necessary, try slightly squeezing or expanding the inductors associated with the high pass filter section to optimise the above figure. I have found that this is not usually necessary.

Next, connect the dummy load to the UHF port of the combiner and the 50 ohm power meter to the VHF port of the combiner. Apply RF power (50 watts) at 440 MHz to the antenna port of the combiner and observe that the power level is at least 40 dB down.

Finally, check the insertion loss. It will probably be around 1 dB. This is done by connecting the power meter to the antenna port and applying a known power level to the appropriate VHF and UHF ports respectively and measuring the result. The loss for a power level of 50 watts should be around 10 watts.

When carrying out all of the above, try placing the lid on the die cast box to make sure there are no violent changes in performance — indicating a possible problem.

Specifications (measured)

Insertion Loss — approx 0.8 to 1 dB (VHF & UHF) to antenna.

Attenuation — 45 dB at 400 MHz for the low pass filter.

— around 44 dB at 149 MHz for high pass filter.

Test instrument used — Wiltron Network Analyser.

Conclusion

Commercial dual band antennas for mobile use are available from the normal outlets around town. To save money and retain what I think is a fairly modest antenna (remember — "she who must be obeyed"), I use a 2 metre quarter wave whip. This whip is harmonically related to the 70cm band and works reasonably well with some compromise in VSWR.

I have found no adverse effects using this homebrew combiner. RF power levels of 50 watts should not be exceeded. The unit has been running now for a number of months with no sign of problems. Remember to exercise EXTREME CARE when building and testing this project. If you are unsure of its operation during the testing phase, seek out help rather than have your receiver front end replaced at the factory.

By way of interest, it should be noted that this combiner can be used to feed two antennas — 2 metres and 70 cm from the one feeder, thus saving dual feeder runs up the tower. The only thing to keep in mind is the insertion loss. If two combiners are used, (at the top of the tower and in the shack), this loss will be about 2 dB, which can be made up with antenna gain.

My thanks to Les VK3SL, for without his inspiration (or badgering) this project would not have happened. The combiner could have been built using surface mount components etc, giving perhaps, improved performance. However, the use of "normal" components does give the desired performance and is easier on the constructor. The cost of this project is about 1/3 the cost of the commercial unit at around the low $20s mark.

Well, there it is, I hope you get as much pleasure out of yours as I do with mine. You can say with pride, "I built it myself" (rare these days).

Prevent pirates — make sure you sell your transmitter to a licensed amateur.

Remote TNC Operation

Bill Rowe VK2AAU

Remote operation of a TNC from the transceiver is sometimes desirable. This may be due to the PC not being in the shack or the RF noise from the PC may desense an adjacent radio. Here is how to do it.

Remote operation of the TNC is preferable to running long RS232 cables as RS232 is not made for long runs. However the connection between the radio and the TNC is only audio and DC control signals. There are some traps however which can be overcome.

Long audio and DC cables between the radio and TNC may be prone to earth loops and induced hum and noise. These problems can be overcome by using paired cable and matching transformers. The matching transformers convert the unbalanced audio at the radio into a balanced line. This overcomes most problems and the earth loop for audio is broken.

The PTT signal is DC and is relatively high impedance and level and so can be an earth return circuit. The squelch is similar if needed.

Commercially telephone circuits have been using transformers and balanced circuits for years. They also use the wire pair for DC signalling using earth return at the same time.

Telephone cable is cheap and readily available. It is available in small sizes of 2 and 3 pairs which means 4 and 6 wires. The pairs of wires are the balanced circuits. They are colour coded in the cable and some of the types sold use very simple codes. One I saw used colours and the number of colour dots to indicate the pair. The pairs are loosely twisted together and are easy to identify.

The transformers used commercially are 600 : 600 ohm and are made with very good balance and high grade insulation. This is because telephone lines are often subject to high noise and induced voltages.

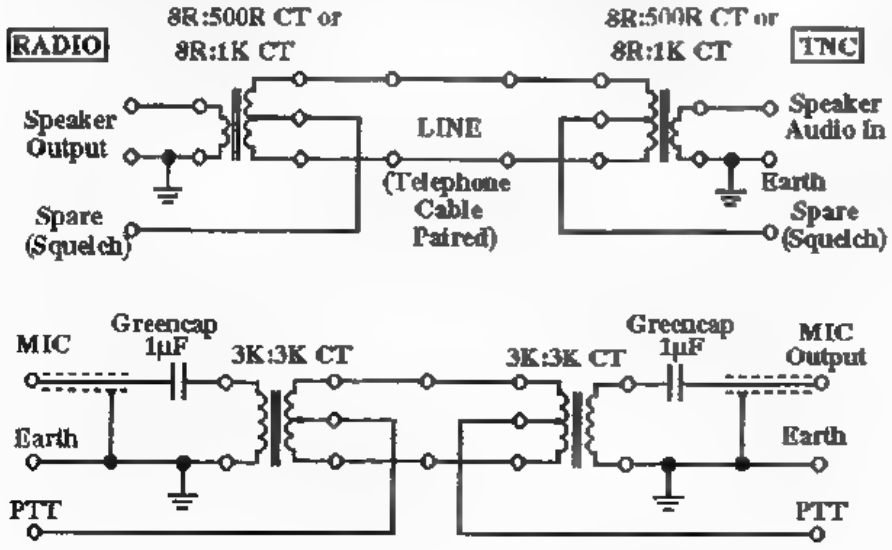


Fig 1 Remote Operation of Transceiver from TNC

However for the sort of line in your home such expensive transformers are not needed. The transformers intended for transistor radio audio stages are adequate and are available cheaply from a number of suppliers. The impedances may be different but they are close enough.

The figure of 600 ohms is after all just an agreed standard and is not the impedance of the cable used.

For the audio output of the radio the transistor radio output transformers are suitable. These have an 8 ohm to 500 ohm or 1000 ohm ratio and the higher impedance winding is centre tapped.

The microphone input can use the 3000 ohm to 3000 ohm centre tapped driver transformers. The impedance is fairly close and the main thing is to balance the circuit as the microphone input is particularly sensitive to hum and noise. A long unbalanced screened microphone lead is an open invitation to hum and noise. An unscreened unbalanced lead is worse.

The loss through a pair of these transformers is pretty small and the balance is adequate. The PTT can ride on the centre taps as an earth return signal. DC blocking capacitors are in series with both the TNC and radio microphone leads. 1 microfarad greencaps or similar are suitable.

The circuit is shown in Fig 1. As can be seen four transformers are used. Two each of the driver type and two each of the output type. The use of 3 pair cable will leave you with a spare pair. This may be useful.

One note of caution. Do not use the same cable for telephone circuits. Telephone wiring and equipment is subject to AUSTEL regulations. Get someone with the appropriate AUSTEL licence to do any telephone wiring.

ar

Remember to leave a three second break between overs when using a repeater.

123 Hz Access Tone for the Dick Smith 430 MHz Explorer

A M Crowther VK3SM
28 Reynolds Pde
Pascoe Vale Sth 3044

The advent of the new 430 MHz repeater VK3REO which requires a tone of 123 Hz for access gave both Reg VK3LS and myself a few headaches. For starters, we did not know the stability or level required for the tone. After some tests we decided that a Wien Bridge oscillator would be satisfactory, and a level about 15 dB below voice was required to open the repeater.

The final circuit is shown in Fig 1 and is a Wien Bridge Oscillator designed round a 741.

This chip needs positive and negative supply lines. As the Explorer has only a 12 V line, a virtual ground was provided by two 10 K resistors in series across the supply, the lower one bypassed by an electrolytic condenser for both stability and to complete the output circuit.

Frequency is adjusted by C1, C2 and R1, R2. As C1, C2 are 0.1 μF then R1, R2 need to be about 12 K. The precise frequency can be obtained by starting with 15 K and paralleling extra resistors.

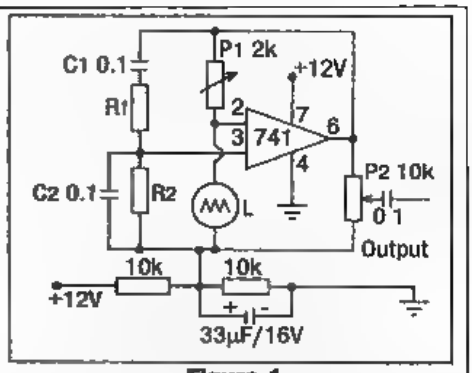


Figure 1

The lamp from 741 pin 2 to virtual ground is any small 20 to 30 mA one and potentiometer P1 is adjusted to give a good sine wave out.

The tone is injected through a 15 K resistor at the junction of R68 and R69, just before the varactor diode in the Explorer. The level is adjusted so as to just access the repeater.

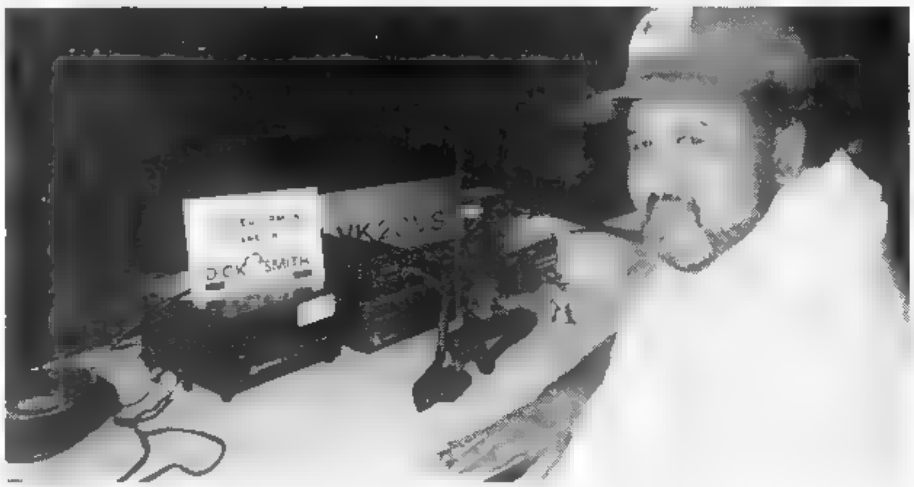
The oscillator was built on a small board mounted just behind the microphone socket. The 12 V supply comes from the board stake at A6 on the main board with earth from the back of the front panels. A switch will be put in next to the microphone socket when I find one small enough. ar

Hurricane INIKI — Help from Australia

In the rescue operation in KAUAI after hurricane Iniki devastated the island, two Australian amateurs were instrumental in providing the major civil communications link on the island via Amateur Radio. The agencies assisted were the American Red Cross, the Salvation Army, and other relief organisations.

Amateur Radio equipment and accessories was loaned by Dick Smith Electronics, Coburg Branch, Victoria, to volunteer Amateur Radio operators Sam Voron VK2BVS, and Richard Hoskin VK3JFK. These amateurs flew to the island to assist in re-establishing basic civil communications.

The radio traffic that they passed was essential in organising and providing supplies of food, water, medical help, shelter, electricity and essential household items to the hurricane victims. ar



The manager of the Red Cross shelter using Sam Voron's amateur radio equipment at the Waimea High School, to converse with the American Red Cross HQ in Lihue.

YOUR ANTENNA SUPERMARKET

We carry a wide range of antennas and accessories.
Here are just a few...

HUSTLER RX-2 2m 5/8 WAVE MOBILE

Here's value! A quality American 2m 5/8 wave magnetic mount antenna for mobile or temporary base station use. Comes complete with 4.5m of coax cable with a PL259 attached. It provides 3dB gain with a power rating of 100W maximum, and uses a flexible stainless steel whip to minimise wind loading.

Cat D-4805 **$49.95**

HUSTLER 1/4 WAVE MAGNETIC ANTENNA

HUSTLER

A great idea for extending the range of handheld transceivers! The Hustler UGM is a compact 1/4 wave magnetic mount mobile antenna supplied with 2.1m of mini coax fitted with a BNC plug. Simply use the supplied frequency chart to cut the flexible stainless steel whip to required length for your application (within the 140-500MHz range) and it's ready to use.

Cat D-4802 **$39.95**

DUALBAND MOBILE ANTENNAS

Our exclusive range of Brainer 2m/70cm antennas provide excellent performance at a reasonable price. They feature quality Japanese construction and come complete with detailed, locally written instruction sheets so you can get the best from your mobile station.

a) TM-723m MAGNETIC 2m/70cm ANTENNA

The TM-723m is a compact, slimline dualband mobile antenna ideally suited to vehicles where a permanent mounting position is not available (eg. a company car). While just 0.7m long, the TM-723m provides 1.7dB gain on 2m and 4.7dB gain on 70cm and has a maximum power rating of 50W (conservative). Supplied complete with low loss coax cable fitted with a moulded PL-259 plug.

$99.95 Cat D-4812

New for '93

BRAINER

b) ST-7500 2m/70cm ANTENNA

The ST-7500 is a compact, medium gain dualband antenna that provides good performance when gutter or roof mounted. It's just 1m long, provides 3dB gain on 2m and 5.5dB gain on 70cm and has a maximum power rating of 150W. A quality tapered stainless steel whip element and an inbuilt tilt-over mechanism make the ST-7500 ideal for use on vehicles that often have to enter garages or carparks. Requires an SO-239 antenna base (D-4035 or D-4052 recommended), or SO-239 magnetic mount (D-4520).

BRAINER **$79.95** Cat D-4810

c) ST-7800 DELUXE 2m/70cm ANTENNA

Our best dualband mobile antenna! The ST-7800 is ideal for long range mobile operation, providing high gain (4.5dB on 2m, 7.2dB on 70cm) from its 1.5m length. Like the ST-7500, it incorporates an inbuilt tilt-over mechanism to allow laying the antenna over when entering carparks, and it can either be gutter or roof-mounted with good results. With its high gain and 150W power rating the ST-7800 can also be used successfully as a temporary base station antenna. Requires an SO-239 antenna base (D-4035 or D-4052 recommended).

BRAINER Cat D-4815 **$129.95**

New for '93

REVEX SWR/PWR METERS

Revex meters feature quality Japanese construction, large meter movements and low-loss wideband SWR/PWR sensors. We carry 2 of their popular models, the W502 and the W540, each of which provide 3 power reading scales plus SWR measurement, but with differing frequency coverage.

W502 HF/6M METER

Covers 1.8 - 60MHz and has an accurate P.E.P. metering circuit. As well, it has 20W, 200W and 2kW scales and a back-lit meter. Requires 13.8V DC.

Cat D-1360 **$239**

W540 VHF/UHF METER

Covers 140 - 525MHz and has an average reading metering circuit. It has 4W, 20W and 200W scales. Requires no DC power.

Cat D-1370 **$199**

Great Price!

2 POSITION COAX SWITCH

Cat D-5200 **$39.95**

A heavy duty, 2 way coax switch that's suitable for Amateur, or commercial applications. It's well constructed with a die-cast case and can handle up to 2kw PEP or 1kW CW at 30MHz with less than 0.2dB insertion loss.

YAESU SP-4 EXTENSION SPEAKER

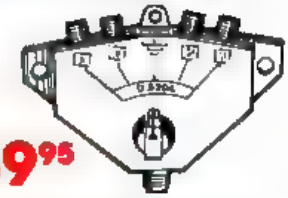
$39.95

This quality speaker has a built-in switchable noise filter and comes with a swing mounting bracket. It handles 3W at 8 ohms and looks smart alongside any RF rig. Comes complete with lead and 3.5mm mono plug.

Cat D-2300

With Surge Protection

4-WAY COAX SWITCH



$89.95

A high quality 4-way coax switch featuring rugged die-cast aluminium construction, 2kW P.E.P. (max.) power handling at 30MHz, and only 0.3dB insertion loss. It has an in-built surge suppressor and automatic grounding of all unused connections. In conjunction with a 'ground' position on the switch, it helps protect against lightning induced surge damage.

Cat D-5204

RUGGED HF 5-BAND TRAP VERTICAL ANTENNA

HUSTLER

The tradition continues! The 5BTV is yet another masterpiece from the people who have been making antennas for over 33 years. This rugged 5 band HF trap vertical uses Hustler's exclusive trap design (25mm solid fibreglass formers, high-tolerance trap covers and low loss windings), for accurate trap resonance with 1kw(PEP) power handling. Wideband coverage is provided on the 10, 15, 20 and 40m bands (SWR typically 1.1:5:1 at resonance, less than 2:1 SWR at band edges), with 80kHz bandwidth typical on 80m at less then 2:1 SWR. An optional 30m resonator kit can also be installed without affecting operation of the other bands.

High strength aluminium tubing and a 4mm (wall thickness) extra heavy-duty base section provides optimum mechanical stability. What's more, stainless steel clamps and hardware guarantee a longer life. At just 7.65m the 5BTV can be ground mounted (with or without radials, although radials are recommended) or it can be mounted in an elevated position with a radial system. Unlike other antenna designs the 5BTV can be fed with any length of 50 ohm coax cable.

Cat D-4920

Hurry, last chance at the old price!

$299

Made in USA

30m RESONATOR KIT

Adds 30m coverage and includes all hardware.

Cat D 4921

$89.95

VRK-1 RADIAL KIT

Provides a 5-band ground-plane for above ground antenna mounting positions.

Cat D-4922

$69.95

DIAMOND D-130J DISCONE ANTENNA

This quality Japanese discone antenna covers the frequency range 25-1300MHz and is easy to assemble and install. With extensive aluminium and stainless steel construction it's extremely durable, while allowing transmission on the 6m, 2m, 70cm and 23cm bands with a maximum power rating of 200W PEP. Complete with mast mounting hardware, stainless steel J-bolts and instructions.

Cat D-4840

$169

VHF/UHF BASE STATION ANTENNAS

We carry a wide selection of high quality vertically polarised base station antennas to suit most VHF/UHF Amateur applications. Each antenna was chosen based on its tested performance, reliability, construction quality and value for money, so you can be confident they'll work well the first time and last for years. Brands supported include Diamond and Brainer from Japan, as well as an excellent Australian made Mobile One product.

a) HIGH PERFORMANCE VHF/UHF BASE STATION ANTENNAS

These antennas from Diamond and Brainer are all of a stacked coil near type which provide high gain, wide bandwidth and a low radiation angle for extended range base station operation. Each antenna uses a jointed F.R.P. (fibreglass reinforced polyester) outer tubing radome with gasket seals to ensure excellent all weather operation, and is supplied with compact ground-plane radials for a clean radial pattern. Corrosion resistant stainless steel mounting hardware is also supplied. Brainer antennas are exclusive to Dick Smith Electronics and feature detailed locally written instruction sheets. Both brands are covered by a 1 year warranty.

2m ANTENNA F-23A

Frequency	144-148MHz
Gain	7.8dB
Max Power	200W
Length	4.53m
Type	3 x ⅝ λ colinear
Connector	SO-239

Cat D-4850

DIAMOND

$239

2m/70cm ANTENNA GST-1

Frequency	144-148MHz, 430-440MHz
Gain	6.0dB(2m), 8.0dB (70cm)
Max Pwr	200W
Length	2.6m
Type	2 x ⅝ λ colinear (2m), 4 x ⅝ λ colinear (70cm)

Cat D-4830

BRAINER

$199

23cm ANTENNA F-1230A

Frequency	1260-1300MHz
Gain	13.5dBi
Max Power	100W
Length	3.06m
Type	25 x ½ λ colinear
Connector	N-type

Cat D-4870

$299

2m/70cm ANTENNA GST-3

Frequency	144-148MHz, 430-440MHz
Gain	7.9dB (2m), 11.7dB (70cm)
Max Power	200W
Length	4.4m
Type	3 x ⅝ λ colinear (2m), 7 x ⅝ λ colinear (70cm)
Connector	SO-239

Cat D-4835

BRAINER

$279

b) ECONOMY 2m BASE STATION ANTENNA

An outstanding value-for-money, compact ½ wave Australian-made 2m base station antenna which is only 1.69m long. It uses a single section F.R.P. radome for excellent all-weather operation and covers 144-148MHz with less than 1.5:1 SWR. The antenna provides approximately 3dB gain with a maximum power handling of 200W FM. It's fitted with an SO-239 socket mounted into the base for easy coax connection.

Cat D-4820

5 Year Warranty

$49.95

MOBILE ONE

DS XPRESS PHONE & MAILORDER SERVICE
Outside Sydney (FREE Call) 008 22 6610 Sydney And Enquiries - (02) 888 2105
FAX: (02) 805 1986 or write to DS XPRESS, PO BOX 321 N/RYDE NSW 2113
All Major Credit Cards Accepted. O/Nite Courier Available.

DICK SMITH ELECTRONICS

NSW • Albury 21 8399 • Bankstown Square 707 4888 • Blacktown 671 7722 • Brookvale 905 0441 • Bondi 387 1444 • Campbelltown 27 2199 • Chatswood Chase 411 1955 • Chullora 642 8922 • Gore Hill 439 5311 • Gosford 25 0235 • Hornsby 477 6633 • Hurstville 580 8622 • Kotara 56 2092 • Liverpool 600 9888 • Maitland 33 7866 • Miranda 525 2722 • Newcastle 61 1896 • North Ryde 878 3855 • North Sydney (Greenwood Plaza) 964 9487 • Orange 615 400 • Parramatta 689 2188 • Penrith 32 3400 • Railway Square 211 3777 • Sydney City 267 9111 • Tamworth 68 1711 • Wollongong 28 3800 **ACT** • Belconnen (06) 253 1785 • Fyshwick 280 4944 **VIC** • Ballarat 31 5433 • Bendigo 43 0388 • Box Hill 890 0699 • Coburg 383 4455 • Dandenong 794 9377 • East Brighton 592 2388 • Essendon 379 7444 • Footscray 689 2055 • Frankston 783 9144 • Geelong 232 711 • Melbourne City 399 Elizabeth St 326 6088 & 246 Bourke St 639 0396 • Richmond 428 1614 • Ringwood 879 5338 • Springvale 547 0522 **QLD** • Booval 282 6200 • Brisbane City 229 9377 • Buranda 391 6233 • Cairns 311 515 • Capalaba 245 2870 • Chermside 359 6255 • Maroochydore 791 800 • Rockhampton 27 9844 • Southport 32 9033 • Toowoomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 • **SA** • Adelaide City 232 1200 • Beverley 347 1900 • Elizabeth 255 6099 • Enfield 260 6088 • St Marys 277 8877 **WA** • Cannington 451 8888 • Fremantle 335 9733 • Perth City 481 3281 • Midland 250 1460 • Northbridge 328 6944 **TAS** • Hobart 31 0800 • Launceston 344 555 **NT** • Darwin 81 1977 **STORES ACROSS AUSTRALIA AND NEW ZEALAND**

B1463

AMSAT Australia

Bill Magnusson VK3JT 359 Williamstown Rd Yarraville VIC 3013
Packet: VK3JT@VK3BBS

National Co-ordinator
Graham Ratcliff VK5AGR
Packet: VK5AGR@VK5WI

AMSAT Australia net
Control station VK5AGR
Bulletin normally commences at 1000z, or 0900z on Sunday evenings depending on daylight saving and propagation . Check-ins commence 15 minutes prior to the bulletin.
Frequencies: (again depending on propagation conditions)
Primary 7.064 MHz. (Usually during summer).
Secondary 3.685 MHz. (Usually during winter).
Frequencies +/– 5 kHz for QRM.

AMSAT Australia Newsletter and Software Service

The newsletter is published monthly by Graham VK5AGR. Subscription is $25 for Australia, $30 for New Zealand and $35 for other countries by AIR MAIL. It is payable to AMSAT Aust. addressed as follows: AMSAT Australia, GPO Box 2141, Adelaide SA 5001

I have been asked for a complete list of all amateur radio satellite frequencies. The following list is the best I have been able to put together. There are problems in that many satellites have multiple transponders, beacons and modes of operation. Some like the RS series are switched randomly. Fuji rarely adheres to the published schedule for very long. Others like Kitsat are still in experimental mode and can come up on unexpected frequencies. The only way to be certain which of the UoSat-11 beacons is on is to decode the telemetry on 2 metres (which is nearly always on). So it's really a case of keep your ears open, join the AMSAT nets, subscribe to the bulletins, keep up with the packet BBS information and do a lot of listening. Anyway, here's the list. I'll try to update it every six months or so. Please advise me of any errors or omissions.

Satellite	Up-Link	Down-Link
Oscar 10 (AO-10)		
Now out of control. Switches on and off randomly. Transponder may be on the when beacon is silent.		
General Beacon (Carrier only)		145.810
Engineering Beacon (rarely heard, meaningless)		145.987
Mode B (SSB,CW-Inverting)	435.030-435.180	145.825-145.975
Oscar 11 UoSAT-2 (UO-11)		
Beacon (1200 AFSK,FM)		145.826
Beacon (1200 AFSK,FM)		435.025
Beacon (1200 AFSK,FM)		2401.500
Radio Sputnik 10 (RS-10)		
Beacon/Robot (CW)		29.357
Beacon/Robot (CW)		29.403
Mode A (SSB,CW-Inverting)	145.86-145.90	29.360-29.400
Robot Mode A (CW)	145.82	29.357 or 29.403
Beacon/Robot (CW)		29.357
Beacon/Robot (CW)		29.403
Mode K (SSB,CW-Inverting)	21.160-21.200	29.360-29.400
Robot Mode K (CW)	21.120	29.357 or 29.403
Beacon/Robot (CW)		145.857
Beacon/Robot (CW)		145.903
Mode T (SSB,CW-Inverting)	21.160-21.200	145.86-145.90
Robot Mode T (CW)	21.120	145.857 or 145.903
Radio Sputnik 11 (RS-11)		
Beacon/Robot (CW)		29.407
Beacon/Robot (CW)		29.453
Mode A (SSB,CW-Inverting)	145.91-145.95	29.410-29.450
Robot Mode A (CW)	145.83	29.407 or 29.453
Beacon/Robot (CW)		29.407
Beacon/Robot (CW)		29.453
Mode K (SSB,CW-Inverting)	21.210-21.250	29.410-29.450
Robot Mode K (CW)	21.130	29.407 or 29.453
Beacon/Robot (CW)		145.907
Beacon/Robot (CW)		145.953
Mode T (SSB,CW-Inverting)	21.210-21.250	145.91-145.95
Robot Mode T (CW)	21.130	145.907 or 145.953
Radio Sputnik 12 (RS-12)		
Beacon/Robot (CW)		29.408
Beacon/Robot (CW)		29.454
Mode A (SSB,CW-Inverting)	145.91-145.95	29.410-29.450
Mode A (CW)	145.831/.840	29.408 or 29.454
Beacon/Robot (CW)		29.408
Beacon/Robot (CW)		29.454
Mode K (SSB,CW-Inverting)	21.210-21.250	29.410-29.450
Mode K (CW)	21.129	29.408 or 29.454
Beacon/Robot (CW)		145.912
Beacon/Robot (CW)		145.959
Mode T (SSB,CW-Inverting)	21.210-21.250	145.910-145.950
Mode T (CW)	21.129	145.912 or 145.959
Radio Sputnik 13 (RS-13)		
Beacon/Robot (CW)		29.458
Beacon/Robot (CW)		29.504
Mode A (SSB,CW-Inverting)	145.96-146.00	29 460-29 500
Mode A (CW)	145.84	29.458 or 29.504
Beacon/Robot (CW)		29.458
Beacon/Robot (CW)		29.504
Mode K (SSB,CW-Inverting)	21.260-21.300	29.460-29.500
Mode K (CW)	21.138	29.458 or 29.504
Beacon/Robot (CW)		145 862
Beacon/Robot (CW)		145.908
Mode T (SSB,CW-Inverting)	21.260-21 300	145 960-146.000
Mode T (CW)	21.138	145.862 or 145.908
AMSAT Oscar 13 (AO-13)		
General Beacon (400 BPSK,		

Satellite	Up-Link	Down-Link
CW, 50 Baud RTTY)		145.812
Engineering Beacon (PSK,CW,RTTY)		145.985
Mode B (SSB,CW-Inverting)	435.420-435.570	145.825-145.975
General Beacon (400 BPSK, 50 Baud RTTY)		435.651
Engineering Beacon (PSK, RTTY)		435.677
Mode L (SSB,CW-Inverting)	1269.330-1269.641	435.715-436.005
Mode J (SSB,CW-Inverting)	144.423-144.475	435.940-435.990
Beacon (PSK,RTTY)		2400.325
Beacon (PSK,RTTY)		2400.664
Mode S (SSB,CW,FM)	435.601-435.639	2400.711-2400.747
Mode Rudak	1269.71	435.677
Oscar 14 (UO-14)		
Mode J (9600 bps A/FSK,FM)	145.975	435.070
Oscar 16 Pacsat (AO-16)		
Mode J (1200 BPSK BBS,FM-SSB)	145.90/92/94/96	437.025 or 437.050
Mode S (1200 BPSK BBS,FM-SSB)		2401.1 or .1428
Oscar 17 Dove (DO-17)		
Beacon 1 (1200 bps AFSK, Digital Voice,FM)		145.82516
Beacon 2 (1200 bps AFSK, Digital Voice, FM)		145.82438
Beacon 3 (1200 BFSK, Digital Voice,SSB)		2401.2205
Oscar 18 Webersat (WO-18)		
Mode J (1200 BPSK,RC,SSB)		437.075 or 437.10
Mode J		144.30-144.50
ATV (TV,AM)		1265.000
Oscar 19 Lusat (LO-19)		
(1200 AFSK,FM-SSB)	145.84/86/88/90	437.1535 or 437.1258
Oscar 20 JAS-1b (FO-20)		
Beacon JA (CW,Analog)		435.795
Mode JA (SSB,CW)	145.90-146.00	435.80-435.90
Beacon JD (CW)		435.910
Mode JD (1200 BPSK,FM-SSB)	145.85/87/89/91	435.910
Oscar 21 (AO-21), Radio Sputnik 14 (RS-14)		
Beacon (CW)		145.822
Beacon (BPSK,FM)		145.952
Beacon (BPSK,SSB)		145.983
Mode B (SSB,CW-Inverting)	435.022-435.102	145.852-145.932
Rudak 2 (A/BPSK,FM)	435.016/.155/.193	145.983 or 145.987
Rudak 2 (Various Modes)	435.041	145.983 or 145.987
Beacon (CW)		145.948
Beacon (BPSK,FM)		145.838
Beacon (BPSK,FM)		145.800
Mode B (SSB,CW-Inverting)	435.043-435.123	145.866-145.946
Oscar 22 UoSAT (UO-22)		
Mode JD (9600 Baud FSK,FM)	145.90/.975	435.120
Oscar 23 Kitsat-1 (KO-23)		
Mode J (9600 BPSK BBS)	145.85/.90	435.175
Russian Space Station MIR		
1200 bps afsk packet and voice.	All operations	145.550 MHz

Where a satellite has multiple uplinks it is to help sort out QRM by spreading out the up-linking stations.

To find out which mode is operating on the RS series, listen for the CW beacon. This will indicate which transponder is switched on.

AO-13 frequencies depend on the mode switching schedule which is published regularly via packet radio BBSs and is available first hand by decoding the telemetry beacon information.

UoSat-11 Telemetry Decoding and Display Program

For some years I used the telemetry from this bird in my work with senior electronics and computer science students. We had BBC computers and I had one at home which made it easy to prepare lesson material etc. At about the time I left the education department the format of the telemetry on UoSat-11 was changed. It went all clever with multiplexed channels and forth language telemetry. Only a couple of months ago I sent off to AMSAT-UK for a copy of the new decoding and display soft-ware to suit my newly acquired IBM computer, (a second hand XT).

The new soft-ware (called TLM) is very flash with lots of colour and good resolution. It is capable of handling the entire gambit of UO-11 telemetry modes including ascii bulletins, real-time telemetry and whole orbit data both in graphical and tabular form. It can archive the files for future reference, in fact it does so automatically. It has the option for full screen graphics display or half graphics and half text display. The graph axes can be changed at will to emphasise particular parts of the data and analyse short term trends. Two telemetry channels can be displayed on the same graph with independent control of axis calibration. Screen data can be printed out at any time.

If you're interested in UO-11 telemetry decoding this package will do all you require. Unfortunately it's not available locally, you have to obtain it from AMSAT-UK.

ar

VHF/UHF An Expanding World

Eric Jamieson VK5LP PO Box 169 Meningie 5264

All times are UTC

Antarctica

In November, Mark VK5AVQ (now VK0AQ) arrived at Casey Base for a further stint in the cold regions. In a letter written on Christmas Day, he said the temperature was 0°C and little wind and so far no blizzards. Visitors during a week or so after 16/12 were to include their supply ship Voyage 5, then a Japanese pilot circumnavigating Antarctica, followed by a Russian tourist ship. From Voyage 5, a team of Army riggers will spend eight weeks erecting towers, plus a new ionosonde. A computer technician will install a new computer network.

Mark says that at Casey there is more snow for ski-ing, instead of the large areas of ice as at Mawson. Casey is an all new station, about 400 metres from the old station, but it appears not to lend itself very well to amateur operation, due to interference with and from other facilities. On HF there are two 1 kilowatt transmitters for company. The base is connected to the ISD telephone network.

For six metres, Gil Sones VK3AUI, loaned Mark an HL86V amplifier and an FP757GX switch mode power supply to supplement other equipment loaned by VK5NY, and a three element beam. He will advise when the six metre beacon is on air. The distance is around 4000+ km.

Other six metre news from the VK5LP shack — 25/12: KH6 and FK8 worked in Adelaide. 30/12: VK7ZMF to NH6YK, KH6JEB, AH6LR, KH6HH, ZL1-4 and VK1-8. 5/1: heard that ZL1ANJ had worked 30 stations in 7 US states, including as far east as Kansas. VK2ZXC said Costa Rica (TI) was in for 3 hours. 6/1: 0500 heard P29BPL, 0800 JAs, FK8DH, 0915 worked ZL3TIC and ZL3AAU, the ZL3MHF beacon S5, also VK3BQS on backscatter. 1001 VK7LZ and VK7ZMF.

7/1: 0100 ZL1ANJ, 0400 VK3XRS, 0900 VK3OT to BZ4BRX, BZ4SBN and BZ4SBV, HL9UH and JAs, 0915 P29JA to VK4s, 0920 VK5BC to VK6ZAK and VK8AH, and VK6KZ to P29JA, 2300 VK4BRG, VK2ZXC, plus VK3OT b/s, 2335 VK4BRG to VK6JQ, VK6PA, VK6RO and VK6HK — really long haul contacts. 8/1: 0933 VK8ZLX 5x9, said KH6 and FK8 were heard at 0430. 12/1: 0513 KH6IAA and AH6LR worked by VK3OT and VK5BC. 16/1: JAs and KH6 at 0300. 26/1: 0417 JAs, Es to VK1,2,3,4,6,7,8 — all states seemed to be working one another, VK6AS said he had worked 2, 3, 5 and 8, much backscatter.

An overall view of six metres would be to say that it has been a good Es season, with contacts available to somewhere almost every day since early December, and this has included FK8. Frequent long haul contacts to KH6. There appears to have been a high degree of ZL activity and this has flowed on to two metres, indicating an increased awareness that two metres Es does exist. Most consistent signals to VK5 have been from VK4 and VK6. My book shows details of many six metre Es contacts by stations throughout Australia. In general, only the more important contacts have been reported, as we all know that at this time of the year interstate contacts occur almost on a daily basis.

Bangladesh

From December 1992 CQ ham radio magazine, courtesy Graham VK6RO, comes news that the DXpedition to Bangladesh produced a total of 503 contacts for S21ZE. There were 488 contacts to Japan with all areas 0 to 9 being worked, with the exception of JA8, which seems unusual. Other contacts were 7 to BV, 2 to BY, 1 each to DU, P2 and S2, 3 to VK, with VK6JQ being the first VK contact. In addition the following beacons were heard — JA2IGY, JA6YBR, JR6YAG, VS6SIX and DX1HB.

Sporadic E

Scott VK2JSR/VK4JSR writes lending support to the previously aired statement that six metres is not yet dead, even if some of the more exotic contacts have disappeared.

On 20/12: 0030 ZL3TY, 0816 VK6BE, 0913 VK6YU, 2050 KH6HI/P, 2106 ZL1AKW, 2108 ZL2KT.

21/12: 0540 ZL2TPY, 0637 JH0HQP, 2223 K6FV heard.

22/12: 0043 XE2HWB beacon in until 0109, 0150 FK8DH, 0207 YJ8LB, 0222 JH0HQP, 0256 JH1HWZ, 0535 ZL4AAA.

25/12: 0126 and 0701 FK8DH.

28/12: 0449 NI6E/KH6, 2138 ZL1ANJ.

29/12: 0122 AH6LR heard, 0805 VK8RH heard.

30/12: 0302 ZL1ANJ, 0304 JH0HQP, 0307 ZL1ANJ, 0456 KH6HME beacon. Scattered amongst these were VKs.

From Europe

Ted G4UPS reports a very low number of contacts for December. Most days he has been able to maintain his tropo contact with G3CCH. SM7AED,OZ3SDL, OH3MF, PAs, LA9ZV, LA7ZV heard/worked. Beacons OZ7IGY, OZ6VHF copied. On 13/12 via Es heard YU7AU, YU1EU, DL8NCI, S59AM, I2ADN and work YU2IQ. The only other worthwhile day was 15/12 when Ted worked LA9ZV, SM7AFI, OZ1LIT, OZ1KJG, OZ5PB, OK1MJL and heard OZ7IGY. On 7/12 ZS6WB reported an opening to southern Europe. (Similar to our VK to JA path....5LP).

Ted also reports some confusion with the ARRL DXCC status of newly emerging countries in Europe, particularly from the breakup of former Yugoslavia. As this is not likely to worry VK stations too much under present propagation conditions, I will wait for more information.

Geoff GJ4ICD reports that Jack ZS6LN passed away early in December after a short illness. Jack would have provided a contact from South Africa to a number of VK stations, so he will be missed. Jack now joins Joel N6AMG (known to many as CN2JP) on the list of silent keys.

Although Geoff on Jersey is lower in latitude than Ted, he seems not to have had any really good six metre openings via winter Es. Geoff also says that in this their winter, the usual anti-cyclones are not materialising, hence little activity on the bands above 144 MHz. On 26/12 an opening occurred on 432 and 1296 to Germany and Switzerland.

While I was writing the above, I wondered why the UK did not experience regular six metre contacts to their closer European countries. In order to satisfy my curiosity, I reached for the atlas and had a look at the UK and its relationship to European countries. I was surprised to find that it is a considerable distance even to the closer countries, such as France, Spain, Holland, Belgium etc., particularly from the more distant parts of the UK. Good for Es but a bit far for daily contacts via groundwave and extended groundwave.

In VK we would consider a path of 300 km beyond many operators, except those with high power and large antenna systems, probably 200 km is more realistic for a good signal So it appears that when the Es disappears and in the absence of an aurora, the European scene dies like many other places!

Two metres and above

Enclosed with the six metre letter from Scott VK2JSR was a printout of the log of his activities on 144 and 432 MHz. Scott lives at Lindendale, near Lismore in northern NSW, about 170 km from Brisbane.

On 144 MHz, from 18/12/92 to 3/1/93 he worked VK2BBR, VK2DVZ, VK2MZ, VK2ZAB, VK2ZXC, and VK4s AI, APG, ARN, DH, KJL, KZR, LC, OE, QV, RH, YZ, ZAZ, ZDQ, ZET, and ZQ. On 432

MHz he worked VK4s DH, KZR, LC and KZR. The contact times were about evenly divided between morning and evening, and many of the 84 contacts were repeated on a daily basis.

In addition to the above, on 144.100, there were a series of Es contacts over considerable distances, noted as follows:

21/12: 0546 to 0605, ZL3AR, ZL3TGI — 2 contacts, ZL3TIC, ZL3TY — 2 contacts.

25/12: 0055 VK7XR.

29/12: 0901 VK3DEM, 0907 VK3BRZ, 0909 VK3AMZ, 0910 VK3XRS. Distances involved were: ZL3TY 2630 km, VK7XR 1564, VK3AMZ 1287, VK2ZAB 570, VK2MZ 382, VK2DVZ 343 and VK4KZR 164.

Repeat contacts made for a total of 11 in this group. Well done.

The above indicates a good overall effort and shows that 144 and 432 is still up and running from VK2 to various points up and down the east coast.

My note book tells me that two metre contacts via Es have been quite common. There were openings prior to and on Christmas day, mentioned last month, between VK5 and VK4, VK4 and VK7ZMF. On 31/12 and 1/1 VK3 and VK4 worked one another. On 5/1 at 0900, VK3AMZ heard ZL4OY and ZL4LZ and worked the latter, while VK2s were also working ZLs. On 6/1VK3AMZ to VK4LV. ZLs also available to north Queensland.

Rob VK3DEM from Bairnsdale, is now operational with SSB on HF, 6m, 2m, 70cm, 23cm and 13cm so he does have a reasonable selection of bands from which to choose! Via aurora, recent 144 contacts have been to VK1AU, VK1BG, VK1DO, VK2NJ, VK2ZRE and VK3AMZ. On 29/12 probably via Es, 144.120 contacts at 0901 to VK2JSR, Lindendale, 0904 VK2BBR at Lismore, 0906 VK4TN at Ashmore, 0907 VK2EJE at Grafton, all 5x9. Also VK3s AFW, ALZ, AMZ, AUI, AYI, BQS, BRZ, DLM, DQW, ELV, KKW, ST, TU, WAL, XRS, YTV, ZJC, VK7KAP, VK7XR and VK7ZMF all on 2m. On 1296 the list includes VK3WAL, VK3XRS, VK7KAP and VK7ZMF. We hope that Rob can maintain that measure of activity.

Wally VK6KZ spent some time around Cape Leeuwin, as far west of Albany as you can go, also at Walpole, and found rewards for his efforts. On 4/1 at 2135 he worked VK5KAF, VK5NY and VK5RQ on 144 but nothing heard on 432. Distance to Adelaide 2152 km. On 5/1 at 0006 VK5AKK on 144 and 432. Then VK6AS at Esperance, 6WG and VK6YAU at Albany followed by stations in Perth.

In VK5 the scene on two metres and above has been fairly humming! **Roger VK5NY** from his mountain top palace near Willunga has provided what is a fairly representative report of the past month's activities. Most contacts have taken place in the morning from around 2200, but the evening period from 0900 onwards has had its rewards. Those callsigns shown in italics were worked on both 144 and 432 MHz.

From VK5NY: 8/1: VK6AS at Esperance, VK3DQW, VK5DK, VK3AFW. 9/1: From 2100 VK3BRB, VK6ZFY, VK6KRC, VK6HK, VK5KAF, VK3CY, *VK5NC.* 10/1: VK6AS, VK6AXX, VK3BRZ, VK3DUT, VK3AFW. 11/1: *VK5NC, VK3BRZ, VK3ZJC,* VK3AFW, VK3AUI on 50, 144 and 432, VK3DUT, VK3CY, VK3ZXY, VK3AXH, *VK3DLM, VK5DK, VK3AFW, VK3ZQB, VK6AXX, VK5PO/P, VK6WG, VK6AS,* VK3ZJC.

11-12/1 was a great period with the bands remaining open until 0140. Tropo to Perth from VK5 is not common so all made the most of it. The saga commenced with the VK5 beacon being heard well in Perth and phone calls made to alert operators. VK6KRC phoned VK5NY. The beacon peaked at 2110. Wally VK6KZ was portable at Cape Leeuwin and at 2137 on 144 worked Des VK3CY over a distance of 2507 km. At 0120 Wally worked VK5NY on 432, distance 2152 km, also VK5ZDR and VK5AKK. No 1296 to Adelaide nor to VK5NC in Mount Gambier. VK6AS at Esperance was hearing the Perth stations at a distance of 684 km.

VK5NY worked VK6KRC, VK6AO, VK6ZKG, VK6AS, VK6SQ, VK3UM, VK5KAF, *VK6HK, VK6KZ, VK6ZFY, VK5NC, VK6ZSB.* Band re-opened 0400 to VK6AS, *VK6WG, VK6YAU,* then later to VK3CY, VK3AMZ, VK3UM, *VK3DTO.* On 15-19-22/1 VK3ZQB.

27/1: 0254 VK6AS, 0922 VK6AS, VK3BRZ, VK3ZQB, *VK3AUI,* 2200 VK6AS, VK6AXX, VK6JCJ, VK7ZMF, VK3BBX.

28/1: VK3EUC, VK3YJR, VK3AFW, *VK3DUT, VK3AMZ, VK6YAU;* 2247 VK3CY, VK3KTR, VK3XRS, *VK6AS, VK3BRZ, VK3ELV, VK3ZQB, VK3BMB,* VK5ACY/m, VK6JCJ; at 1324 VK6AS5x9.

29/1: 1340 VK6JCJ, VK6WG; 2148 VK7XR, VK5KAF; 2218 VK6ZKG, VK6ZFY, VK6KRC, VK6HK, *VK6KZ.* At 2336 VK5NY worked crossband 144/432 to VK6KZ with good signals both ways, yet Roger VK5NY could not hear Don VK6HK who was close by across the Swan River! Strange. 2343 *VK3BRZ, VK3AUI.* During the above, flashes of radar krud were observed on 432 MHz peaking in an easterly direction. 1296 MHz was tried but no signals out of VK6 or VK3.

There is no question that the boys in VK6 are prepared to rise early — 2200 UTC is 8.30 am in VK5 and 6 am in VK6! Thus it was that at 2207 VK6AXX phoned VK6ZFY to warn him of possible band openings, as the VK5 two metre beacon was audible! Later Roger worked VK3ZGL, VK3BRB and VK3DEP, all in Mildura, the latter station using a vertical antenna! Several meteor pings to the east on 144.100, but not sustained long enough for identification of any signals.

On 10 GHz

Wally VK6KZ reports that 10 GHz is moving rapidly in Perth. VK6KAT and VK6KRC recently worked VK6ZFY/P over a distance of 85 km VK6XH and VK6ZSB have also been working one another.

Countries first worked from Australia on six metres

No corrections or additions to the list have been received this month, indicating that the list is probably fairly correct. I will leave it open for another couple of months before publishing the final list.

I am also looking at the possibility of publishing a list of what countries/DXCC prefixes were worked on a state by state basis in Cycle 22 only, so that you can make some comparisons. Who worked what will not be included, the list will simply show that a prefix was worked from particular states between 1984 and 1992 inclusive. More later.

Closure

January has been a very hot trying month for most of the southern areas, particularly South Australia with a run of days exceeding 40°C. However, we have survived and looking forward to what DX the equinox may provide.

Closing with two thoughts for the month:

1. Before everything else, getting ready is the secret of success, and
2. Making marriage work is like running a farm. You have to start all over again each morning.

73 from The Voice by the Lake.

■

FTAC Notes

John Martin, VK3ZJC
FTAC Chairman

An Extra Two Kilometres

Steve Gregory, VK3OT, has extended his VK3 50 MHz short path record. His previous record was 16,922 km for a contact with G4UPS on 19/2/91. However on the same day he worked GW3MFY, a mere 2 km further away! Congratulations to Steve on this new record.

■

Divisional Notes

VK2 Notes

Tim Mills VK2ZTM

Annual General Meeting

NSW Division members are reminded that the AGM is scheduled for Sunday afternoon 2 May 1993 at Amateur Radio House, 109 Wigram Street, Parramatta. The annual report and business paper will be an insert to the April 1993 issue of "Amateur Radio".

Those members wishing to submit items for inclusion on the business paper for this meeting or to nominate for election to the Divisional Council for the forthcoming year must lodge same at the registered office of the NSW Division at 109 Wigram Street, Parramatta by 2pm Wednesday 17 March 1993.

Those full members nominating and seeking election to the council should note that upon election they become a director of a New South Wales registered company under the respective companies acts. A nomination form is available from the office, which must be proposed and seconded by full members of the Division and lodged by 2pm on 17 March 1993. If more than the required number (nine) of nominations are received a ballot will be conducted.

An invitation is extended to all full members able to attend two (Friday) evening meetings per month and carry out other duties as a councillor of the Division. If you are not able to be a councillor, there are many other functions within the Division open to all members which could benefit by your involvement.

Happenings

Next Trash and Treasure is Sunday afternoon 28 March at Parramatta.

Next exam at Parramatta Sunday 23 May; applications close 6 May.

The Division's lecture class for the year started 1 February. Held on Monday evenings at Parramatta. St George ARS class to start 8 March.

Orange ARC commenced 18 February; details from Bruce VK2DEQ on (063) 62 8703.

Urunga Field Day over Easter; naturally at Urunga on the north coast.

The 2m SSB transmission from VK2WI is frequency changing to 144.150MHz.

To contact the Division, see the directory details on page 3.

The technical segment on the VK2WI broadcasts has just started a 22-part talk on Australian Radio, the Technical Story by Winston Musico, 10am and 7.15pm Sunday.

VI150SYD report

Steve Pall VK2PS has come up with some statistics regarding last year's special event station VI150SYD:

The station made a total of 6257 contacts; 1005 of them were with Australian stations, 463 of those in New South Wales. There were 178 contacts in the Pacific rim area, taking in 40 countries.

There were 1445 contacts into South-East Asia, all but 91cm of them were Japanese! Africa brought in 31 contacts, North America 1736, the Caribbean 21, South America 61, and Europe a total of 1700.

The European countries included 154 from the United Kingdom, 295 from Italy, 280 from Germany, 110 from France, 110 from Spain, and 197 from the Commonwealth of Independent States.

Steve Pall VK2PS
Divisional Special Projects Officer

5/8 Wave

Rowland Bruce VK5OU

I would like to thank Jenny, VK5ANW, for stepping in at the very last moment last month to ensure a 5/8 Wave appeared in AR.

Once again work called me away, but on this occasion, being holiday time anyway I was able to tack a couple of weeks onto the ten days I had to attend head office in Paris. It may sound great, all this dashing about the place, but it usually is concentrated work, and this time I thoroughly enjoyed the extra time I spent in England. I must say though, as I sit here in 40 degree plus heat, that it is hard to remember a month ago I was driving up the M1 in a freezing fog. Being away so much recently has meant that I am out of touch with goings on in SANT. I'll catch up for next month's issue I hope. Meantime I shall have to content myself with some generalities and observations.

One local event I did attend was the Christmas social at Woodville. Business was kept to a minimum, and we were entertained by a display of magic, which amongst other things showed the lack of expertise by your President in twiddling knobs on some pretty basic equipment. Perhaps all his gear is push button nowadays! We enjoyed some excellent fellowship and a good supper. Thanks to all those who helped or provided. It was a pity more members could not attend. Note this years date will be the 9th or 16th November.

I received an interesting letter from Colin MacKinnon, VK2DYM, about the closure, due to the relinquishing of the building housing it, of the Telecom Museum in Adelaide, along with a letter he had received from AOTC. I hope I might get permission to print extracts of the letter in due course. Suffice to say that it seems as though the material from the museum, although being well cared for by the History Trust of South Australia, will not be on display until the Trust has built a new science and technology museum in Adelaide. As Colin says, maybe we guys in Adelaide should be pushing for the early funding and construction of the museum, and lobbying for the public display of the entire Telecom collection.

I also received the VK5 Scout Radio Activities News, which gave a very good review of JOTA. In SA alone 1870 members and 419 leaders took part, (Guide figures need to be added to these,) with 125 amateur operators being involved. I'm sure that the amateurs enjoyed JOTA, but equally I am convinced that an involvement like that is deserving of thanks. Well done! I also note that Peter Koen has been re-appointed to the position of Project Commissioner Radio Activities by the Chief Commissioner, Robin Maslen. Robin is committed to the

concept of JOTA, and last year visited seven of the stations involved.

Finally, back to Europe. We don't know how lucky we are. QRM and QRN have to be heard to be believed. I saw very few towers, the building restrictions would be different I would think, and there is a problem with TVI due to the large number of houses with dishes for satellite reception. Oh, and another thing. In Australia we don't get our wire antennas "loaded" with frost!

VK6 Notes

Arthur Lumley VK6ZTL

Notice of Annual General Meeting

It is hereby notified that the Annual General Meeting of the West Australian Division of the Wireless Institute of Australia will be held on 20 April 1993 following the General Meeting which commences at 8pm. The meeting will be held at the Westrail Centre, East Perth.

Agenda

1. Consideration of the council's annual report
2. Consideration of the financial report
3. Consideration of other reports
4. Election of office bearers, viz president and vice-president of the Division and seven other councillors
5. Election of two auditors
6. Appointment of a patron
7. General business which has been duly notified.

Notice of Motion for the AGM must be received by the secretary not less than 42 days prior to the meeting, and must be signed by at least three members.

Nominations of a candidate for election to council must be received by the secretary in writing not less than 42 days prior to the meeting, with an intimation that such candidates are willing to act. A candidate may submit a statement not exceeding 200 words outlining his or her case for election, and experience. Each nomination shall be signed by two members proposing the candidate.

Candidates must possess a current amateur licence.

Proxies

Any financial member entitled to vote may appoint a proxy, who must also be a financial member entitled to vote, to speak and vote on his/her behalf. Each such proxy must be in the hands of the secretary prior to the meeting and be in the following form.

I ....., a member of the Institute, hereby appoint ....., also a member of the Institute, to act for me as my proxy, and in my name to do all things which I myself being present could do at the meeting of the Institute held on .....

Signed:

Witness:

Date:

ar

How's DX

Stephen Pall VK2PS PO Box 93 Dural NSW 2158

Poor QSL practices are the worry of all QSL managers. Whilst handling the cards for the special event station VI150SYD I noticed that many amateurs, especially novices, are having difficulty providing the correct information on their QSL cards. Most common problems:

a. Individual watches are not synchronised with correct time (time differences up to one hour).
b. Local time or "am" or "pm" or "night" was used instead of the accepted UTC (GMT) time.
c. Date of the day was wrong, especially if the contact was around 2200 UTC time. Apparently some amateurs cannot distinguish between the local day and UTC day.
d. They are happy to have had the opportunity to work the special event station and ask for a direct card but they do not enclose a self addressed stamped reply envelope for the direct reply.

One only hopes, as time goes by, that they will pick up the necessary knowledge to fill in a QSL card correctly.

Chatham Island DXpedition ZL7AA

Nine New Zealand amateurs organized by Stan ZL2AHC, the NZART Field Day Contest Manager, will be active from this island beginning 0800 UTC on 1 March. The activity coincides with the national NZART Field Day, which takes place on 5 and 6 March. VK contacts are very welcome. During the Field Day, operations will take place on the 40 and 80 m bands. On other days they will be active from 160 to 10 m, including some WARC bands, and on 6 and 2 m. The group will take triband beams, seven transceivers, and equipment for six and two metres. The preferred route for QSLing is direct, with SASE to PO Box 54, Hastings NZ which is the business address of ZL2AL. QSLs will also be accepted via the bureau.

160 Metres Revisited

In AR for April 1992 I asked you to build that special antenna of yours for the 160 m season which usually starts around late April and ends mid-August. Have you done so ? Bob, VE7BS reports that in March 1992 there were excellent signals from Clipperton FO0CI, and weak ones from V85AA. During the northern summer in 1992, he had 58 trans-Pacific contacts, mostly with VKs. On at least 70% of the 92 days (May-August) there was an opening between VE7 and VK. Besides, Bob W0ZV is also quite often on the band.

Incidently during the recent activity from Howland Island the DX station AH1A was heard and worked (on 1822 kHz) from eastern Australia with quite acceptable signal strength. But one had to have the right antenna for the band.

Howland Island AH1A

This much expected DXpedition was first heard as planned on 26 January and closed down at around 1700 UTC on 3 February.

Atsu, VK2BEX operating on Willis Island as VK9WW.

Ian G4LGF, one of the expeditioners, told me that they made just over 50,000 contacts and were preparing to leave the island. The seas were rough, and some inflatable dinghies were overturned. The last two stations operating were SSB on 14195 kHz and CW on 7023 kHz. During their stay it rained almost every night although Howland Island is usually very dry.

Members of the expedition met the transport vessel loaded with equipment and supplies at Christmas Island (T32) on 19 January. After a six day voyage they landed safely and began operating immediately. There were four complete HF stations at two separate sites, one primarily CW and RTTY, the other for SSB. This permitted simultaneous operation on several bands. It was a well organized and well disciplined operation. The callsign was announced frequently and this reduced the possible interference quite considerably.

Clear instructions were given regarding listening-up frequencies and geographical areas to be worked. Despite all this, the Europeans (and one has to say, as usual) were not always as disciplined as the expeditioners would have preferred. The overall cost of the expedition is around $75,000. Individual operators of the ten-person team are committed to $6,000 each, besides their personal transport costs to Christmas Island, so try to be generous with your donation when you send your QSL cards to Mile-High DX Association (MHDXA), PO Box 1, Frankton CO 80116, USA.

Desecheo Island KP5

Randy Rowe, N0TG reported that the whole activity of this brief but successful expedition lasted four and a half days. They had a rough sea voyage (seas running 8 to 10 feet) and the landing on the island was difficult and treacherous. Their campsite was raided during the first night and the spare generator went "missing". The US Coastguard apprehended the perpetrators and recovered the stolen goods. Despite the short time spent on the island the group made 23,000 contacts. Cards go to Randy Rowe, N0TG, PO Box 891, Desoto, TX 75123 USA.

Ethiopia 9F2

Rudi DK7PE has been in Ethiopia and was reported working on 30 January at around 0600 UTC, CW on 14025 kHz, with the callsign 9F2CW/A. The "A" was assumed to indicate Asmara the capital of Eritrea, an independent province (formerly part of Ethiopia). This country may again be restored to DXCC status.

According to Rudi, under the old regime, ET3PG was the club station of the police.

However things are changing in Ethiopia. In January 1993 five foreign amateurs received Ethiopian licences. Rudi DK7PE, Rolf, HB9CVB, Sid G4CTQ and Admase (formerly ET3AR) have helped to form the new Ethiopian Amateur Radio Society (EARS).

Kingman Reef KH5K and Palmyra KH5

As you read this the activity from these islands should be at a peak. Twelve amateurs planned to depart Honolulu on the boat "Machias" on 28 February. Expected time of arrival on the reef was 5 March. Eight operators landed there and four others travelled to Palmyra. The operation from both locations will last nine days in total. Europe will be the main target area. Some WARC bands will also be activated.

Future DX Activity

- Cristian, who operated from Chad as TT8SA, will be in Angola from January and active as D2SA for the next two years. QSL to Antoine Baldeck F6FNU PO Box 14, F-91291 Arpajon Cedex France (SAE + US$2)
- Eli, HA9RE (See Jan 93 AR) has left USA on a catamaran for T30 and T33. By the time you read this, he should be on the air.
- Dave, ZL3DK of the Hastings Branch of the NZART will be looking for contacts on 1840 kHz from 0700 to 1400 UTC on Friday 5 March and Saturday 6 March. This activity will coincide with the ZL Field Day.
- Look out for a possible activity from 9G, Ghana. Several members of the Dutch DAGOE Foundation are trying to raise funds for special medical facilities in Ghana. Ghanaian authorities agree this action will create good relations between Ghana and other national radio societies.
- FD1SIL is active as TT8AKX until end of March.
- ZK1DT is Hugh on Penryn Island until 1996. QSL direct only to Hugh Thomforde, Penryn, North Cook Islands, Central Pacific.
- Ken WA4OBO plans to return to Chad around the middle of March.
- VR6BB is still active from Pitcairn Island. QSL to JH2KOZ.
- Raelene VR6RC — daughter of Tom, VR6TC, was heard from Pitcairn on several occasions on the 28 MHz band. QSL to Box 1, Pitcairn Island, South Pacific, via New Zealand. As the ship bringing supplies and mail comes only every three months, do not expect a card back in a hurry.
- According to the DX News Sheet we can expect some activity from the Andaman and Nicobar Islands (VU7) in March or April.
- Bud, S92ST, Leslie S92YL and Chas S92SS are active in Sao Tome.

Interesting QSOs and QSL Information

Note : Callsign, name, frequency, mode, UTC, month.

- EL2PP, Monica, 14226, SSB, 2244, Dec. QSL to Box 2274, Monrovia, Liberia, West Africa.
- OD5JY, Faiz, 14252, SSB, 0555, Dec. QSL via Bureau.
- 3W4VL, 21003, CW, 0615, Dec. QSL to OK3IA, Pavel Horvath, Radvanska 16, 81101 Bratislava, Slovak Republic.
- XX9TRF, 14019, CW, 0950, Dec. QSL to K2PF, Ralph G Fariello, 23 Old Village Road, Hillsborough NJ 08876 USA.
- VR2GO, Tom, 14215, SSB, 1105, Jan. QSL to Tom Ewing GPO Box 9887, Hong Kong.
- AH0AM, David, 14265, SSB, 1056, Jan. QSL to KB4TXM, David L Creel, PO Box 209, Saipan, MP 96950 USA.
- XR6M, 14194, SSB, 1025, Jan. QSL TO CE6TC PO Box 1234 Temuco Chile, or via the Federachi QSL Bureau PO Box 72 Valparaiso Chile.
- T32BB, Bob, 14192, SSB, 0913, Jan. QSL to DF6FK, Norbert Willand, Leipziger Ring 389, D-60554 Rodgau 3 Germany.
- VP2MH, Laughton, 14226, SSB, 1209, Jan. QSL to KC4DWI BD Kellam, PO Box 936 Cheriton VA 23316 USA.
- V73S, 14021, CW, 1033, Jan. QSL to Oklahoma DX Association PO Box 88, Wellston OK 74881 USA.
- V85AA, Bill, 14226, SSB, 1207, Jan. QSL to Box 1711, BSB, Brunei.

From Here and There and Everywhere

- Neil, VK6NE Federal QSL Bureau Manager for VK9 and VK0, reports that he received some cards for VK0PB. After checking with DoTC it is quite clear that the operator is a "slim". Save your cards and money.
- The Hungarian BUS Expedition (HA5BUS) has run into some financial difficulty in Los Angeles. The bus was impounded by the relevant authorities because the operators were unable to pay the balance of the shipping fee, the demurrage fees and other costs which amounted to over US$15,000. Their plight was televised on a local TV channel and in response, a local businessman of Hungarian origin paid their debt. The bus was free again. They are still in trouble because they were not able to secure a US amateur transmitting licence. There is no reciprocal amateur licence agreement between USA and Hungary. However they already have a Canadian

licence VE/HA5BUS and a Mexican licence 4C2/HA5BUS. I was advised by Imi, HA5HO, one of the operators, that the VK5BUS cards are in preparation and he hopes that the hiccup with the other QSL cards will be solved in the near future. They will be mailing some 1300 cards from Los Angeles soon. The future of HA5BUS is still bleak. The continuance of the voyage depends on availability of funds.

- The popular Southern Cross DX Net (each day at 1100 UTC on 14226.5 kHz) has been subject to very severe interference from a FAX transmission originating from Europe. The interference won. The net moved up to 14236 as from 1 February.
- Francisco HV3NAC was heard operating on 10 January on 14024 at 0806, directing QSLs to his manager IK0FVC.
- Following integration of the two postal systems (West/East) a new five digit post code system will be introduced in Germany from 1 July.
- VU7API and VU7SF were active from the Laccadive Islands. QSL to Phillip W2XP (PO Box 41366, Nashville, TN 37204 USA) who in turn will accumulate the mail for a safe transhipment to India. Send a "green stamp" for return postage.
- Brian, C21BR announced that he is returning to New Zealand mid- April. Future QSL cards for contacts with C21BR should be sent to his home call ZL1ACX.
- P29BT went back to the USA mid-February.
- VI6CKB is a special call celebrating the centenary of the City of Kalgoorlie-Boulder, the centre of goldmining in Western Australia. QSL via the Bureau or to PO Box 463, Kalgoorlie 6430 Western Australia.
- According to the "DX News Sheet" AP2US is a "slim". Please do not QSL.
- If you had a contact with SO1DBA send your card to VK4HD.
- The address of the Slovak QSL Bureau is PO Box 44-8100C, Bratislava 1, Slovakia.
- If you worked ET3RA he was Rolf HB9CVB, QSL to his home call.
- The special event station VI150SYD celebrating the 150th anniversary of the City of Sydney made 6257 contacts with over 160 DXCC Countries during its operation in 1992.
- YB7AWW is Eric. QSL to Box 185 Rosebery NSW 2018 Australia.
- The address of the QSL Bureau for OK1 and OK2 amateurs continues to be PO Box 69-11327, Praha 1, Czech Republic.

QSLs Received

From managers: V51HL(W3HNK 3W), V85BJ (VK2KFS 3W), YA5MM (LZ1HA 3W), XU0NU (F6FNU 4W), PY0FF (W9VA 10W).

From operators: VK9NL/W (3W), VK9WW (4W), HI3AB (18M), V73CT (3W), ZD7CRC (10W).

Thank You

I am always grateful for the assistance received from the supporters of this column. Judging by the number of letters received, there are many of you out there in the readership. Soon you will have a full report. Many thanks to VK2CSZ, VK2KFU, VK3DD, VK4DA, VK4OH, VK5QW, VK6NE, F6FNU, VE7BS, ZL2AHC, and the following publications QRZ DX, The DX bulletin and the Dx News Sheet.

Good Dx and 73.

Pounding Brass

Gilbert Griffith VK3CQ 7 Church Street Bright Vic 3741

The simplest method of sending when it is your over is to use the transmit switch on the rig and start pounding the key. Although this might not be the easiest way if your rig is configured to operate using semi-break-in or full break-in modes, your rig may have its own internal keyer built in so that there is no need for a key at all and a paddle can be connected to the input instead. (The standard fitting has a 6.5mm phone socket on the rig and your 6.5mm stereo phone plug should be wired with the tip to the dot paddle.)

Equipment with all the "features" can still be switched to transmit mode as mentioned, but there is a disadvantage in that you cannot receive anything until you manually switch back to receive mode. This can be disconcerting if you happen to drop dead while transmitting. You have probably experienced other disconcerting moments such as, when, in the middle of a word, your contact abruptly stops transmitting. You eventually find his phone number and ring to see whether a fuse has blown or something more serious has happened.

Most rigs have a "delay" control which causes the transmitter to switch on when the key is pressed, and, depending on what level of delay is set, switches the rig back to receive after you stop sending. This delay can be set so that if you don't send anything for 10 seconds the rig switches to receive, much easier than manually controlling the transmitter. Or you can shorten the delay so that it switches between your sentences, words or even letters. This mode is commonly referred to as semi-break-in, where you can hear for a short time between words. If the delay control has an off position, (which may be tagged "full"), then the delay is non-existent and you can hear between every dot and dash.

Full break-in is the ability to hear incoming signals between your own dots and dashes. This takes a bit of getting used to at first, especially if you neglect setting the equipment up beforehand. Careful control of the AGC speed (which should be set to "fast" or "off"), the receiver volume, as well as the volume of your own sidetone, and background noise are essentials. Practise working a strong "friendly" station with the RF gain turned right down so that the volume of his signal is about the same as your sidetone, it should also be the same pitch. There should be little evidence of background noise when receiving until you are familiar with the operating practices anyway.

Much time can be saved as transmissions are ended with a simple "BK" or "K" to let the other operator have his go. It is amazing how much you can say in the ten minutes or so between identifications. It can be quite exciting when there are three or more stations operating together, you can tell who is talking by their "fist" alone. Other stations have to be quick and lively if they want to sneak a comment in, which makes for a lot of fun.

A simple way of implementing a full break-in system is to use a separate antenna for the transmitter and (separate) receiver. A single antenna may be switched by a timed relay, but it may be preferable to leave the transmitter connected to the antenna permanently and use the relay to disconnect the receiver whilst transmitting. It is then easy to use the other relay contact to earth the receiver input. If you do not earth the receiver input you will need to put two diodes "back to back" across its input, otherwise something is sure to cook.

To summarise, full break-in denotes that you can hear between your own dots and dashes. Semi break-in usually means you can only hear between your words but can probably include the range of delays from hearing between letters, words and sentences.

This is very convenient when interruptions may be required as many operators

waffle on in long "overs" when the listener may be temporarily needed elsewhere. Semi break-in with a long delay, say three seconds, is the easiest way to control your transmitter.

Essential reading for Morslacs

"An End To Silence — The Building of the Overland Telegraph Line" by Peter Taylor (VK4FV), published by Methuen in 1980.

Following my mention of the history of the telegraph in this column, Peter wrote to me with some further information.

"Normally a message took about eight hours to reach London, but at a celebration dinner in Adelaide on 15th November 1872 a reply was received from London in two hours, but only because the line was cleared all the way through for the occasion."

"In good conditions an experienced operator could send about 50 to 60 words a minute, although in normal working conditions about 30 wpm was more usual. However the underwater link from Darwin was much slower. Because the signal was very weak it had to be read directly from a galvanometer and this brought the speed down to about three wpm. Even though automatic repeaters came into use along the land line the contact through the underwater cable was always manual."

"On 23rd February 1874, Aborigines attacked the telegraph station at Barrow Creek, about 200 miles north of Alice Springs. One man was killed instantly (John Franks. Ed) and the officer in charge, James Stapleton, was speared while trying to close the main gate. One of the others sent the news to Alice Springs, where they immediately opened the line to give Barrow Creek a direct connection with Adelaide. When Todd received the news at the GPO in Adelaide he immediately sent his carriage for Stapleton's wife, who lived in an Adelaide suburb. When Stapleton, who was clearly dying, heard that his wife was in the telegraph room in Adelaide he insisted on being lifted to the key. Todd listened as his message came through from that lonely station north of Central Mount Stuart, writing down each letter as it came. It was a short message. When it was finished Todd silently handed the slip of paper to the woman beside him. It read "God bless you and the children."

If you are driving north to Darwin you can see the graves of the two men in a small enclosure near the telegraph station on the east side of the highway."

"More interesting (but perhaps less informative), the first news of the bombing of Darwin in 1942 came down the telegraph line to Adelaide. A technician in Darwin was carrying out tests with Adelaide when he broke off because of an air raid warning (and who would argue with that QRX?). After the raid the Divisional Engineer in Darwin, Harry Hawke, came on the line with news of the raid. The tech had been killed in the raid, the telegraph office had been destroyed and Hawke was using a portable key which he clipped on the line at the end of Smith Street. An army officer fished up the underwater cable from the shallows and cut it so that it would not be available to the Japanese."

Peter also says in his letter that he had no knowledge of Amateur Radio when he wrote the book. He has now had his licence for two and a half years, and is a fully paid up CW addict.

73
Gil
ar

A Packet of Packet

Kevin Olds VK1OK 238 Southern Cross Drive Latham ACT 2615

News came to hand over the Christmas/New Year break that the South Australian Packet Users Group is embarking on a project to compile a packet/network directory for Australia, much the same as the Repeater Directory which appears in the WIA Call Book. This a major but worthwhile project and congratulations are in order to the group for deciding to give it a go. However, it will only be as good as the information they are able to gather. So when the call goes out for information to compile the list, I urge all groups to respond with the details requested. If everyone assumes that someone else will provide the information then things won't be of much use. Don't expect to see any results immediately, these things take time.

Before tackling this month's topic, might I repeat my request for feedback on what you think of the information presented and what you would like to see in the column. I'll try to satisfy all reasonable requests some requests may take a little longer to produce so be patient if between your suggestion and delivery some time elapses.

The first two columns have reviewed some of the happenings in the amateur radio world which have impacted on the packet radio scene. This month we have a topic, which while not strictly packet, deals with an area of development which is already starting to have an impact on the packet scene overseas, and of which more will be heard in Australia in the near future. This months item has been kindly provided by Hugh Blemings, VK1YYZ and introduces the subject of Digital Signal Processing or DSP. This item was also presented to the CPRG Technical Symposium in September 1992. A future column will examine the application of DSP to packet radio in the form of a radio modem that could be all things to all people, just change the software. But now over to Hugh.

An Overview of Digital Signal Processing

Digital Signal Processing by its very nature uses some very complex mathematical techniques. It is not intended to cover their intricacies in this paper, rather to provide a more practical look at the topic. There are excellent books available on the subject which provide a more in-depth mathematical treatment of the techniques used.

What is DSP?

DSP is the arithmetic processing of real-time signals which have been sampled and digitised in both time and amplitude. A simple DSP system might consist of an Analogue to Digital converter (A/D), a microprocessor, computer, or dedicated DSP chip and a Digital to Analogue (D/A) converter, as shown in Figure 1.

Other DSP applications may call for a number of different analogue "front ends"

FIGURE 1 SIMPLE DSP SYSTEM

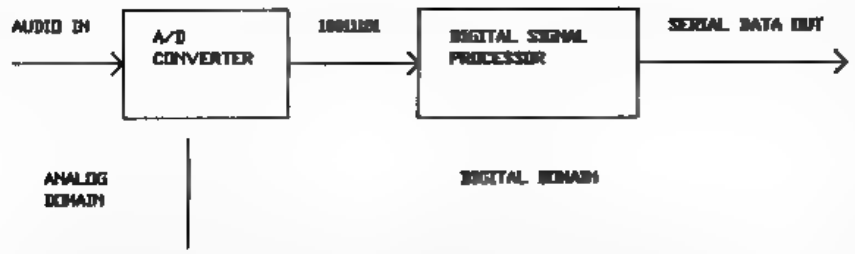


FIGURE 2 SIMPLE DSP FSK DEMODULATOR

or only an single A/D device and associated components in the case of a simple FSK demodulator (Figure 2).

In other words, DSP is a method whereby numbers which represent an analogue signal's amplitude at a known time are manipulated (added, subtracted, multiplied etc) or otherwise processed using a mathematically derived algorithm to generate a new number or set of numbers. The resulting output can then be used to generate a new analogue signal, turn on a light bulb, send data to a computer etc.

Advantages of DSP

DSP offers many advantages over conventional analogue processing, these include;

Stability, Repeatability and Simplified calibration

In typical DSP applications, the system is locked to a quartz crystal derived master clock, the implication then being that a system will remain accurate to a limit defined by this clock signal. An analogue system by comparison may have tens or hundreds of components that can drift independently with temperature, manufacturing tolerances etc. Provided that the software and coefficients used are correct a DSP system will be unconditionally stable.

Following from the above, a DSP system is essentially 100% repeatable unlike say an analogue gyrator circuit which will typically defy all attempts at analysis, calculation and consistent construction etc.

Calibration in a DSP based system will typically be far simpler compared to its analogue equivalent or even non-existent as all parameters such as filter coefficients etc are stored as part of the systems software and are locked to a single frequency reference. Calibration may consist of no more than setting gain levels in the analogue front end and checking the main reference frequency using a frequency counter or similar device.

Power Consumption

Power consumption in a DSP system can often be significantly lower than its analogue counterpart, particularly if CMOS based devices are used. Additionally most DSP devices are fully static in design and hence power consumption is defined by operating speed. This allows a system to be placed into a standby level of power consumption by either slowing or stopping the system clock. This reduction in power consumption becomes more dramatic if a DSP system is replacing several different analogue modules, each with many components.

Power supply design for a system utilising DSP may be simpler as a result of the reduced need for unusual bias voltages etc.

Cost

Cost in a DSP based system is a complex issue, particularly in the commercial realm. Comparisons must be made between the total cost of designing a system using analogue methods and the costs of developing a system using DSP techniques. Additionally the relative costs of manufacturing of each method must be considered.

During the design phase of the project, the sort of factors that need to be considered will include engineering time, cost of development tools and/or test equipment required, cost of prototypes, and cost of any special staff/skills that need to be imported if they are not available in house. For the subsequent manufacture of the device, further cost considerations manifest themselves including (but inevitably not limited to!) the cost of; Components, Printed Circuit Boards, assembly/construction and calibration/Quality Control.

For the right project, the cost of using DSP techniques can be much lower than an analogue based system.

Chip Count/PCB Size

A DSP based system will typically result in a lower chip count than its analogue counterpart and as a result printed circuit board sizes are often smaller.

Algorithms/Functionality

Many algorithms or complex functions that can be implemented with DSP systems are difficult if not impossible to create using analogue techniques. For example, very high Q filters that do not introduce phase distortion within the pass band or near cut-off points and band stop filters with almost infinite attenuation at the desired frequency are readily implemented with DSP techniques.

For amateurs, being experimenters by nature, one of the main benefits of using DSP systems is in the ability to be easily modified, typically without changes to hardware. Using the example of a packet radio modem, it is possible to design a system that uses a common hardware design with a variety of different software modules to implement all of the current data modulation techniques.

Disadvantages of DSP

The use of DSP techniques has a number of disadvantages, some of which are particularly applicable to the amateur/hobby user

Complex mathematical and theoretical concepts

Perhaps the greatest disadvantage in using DSP techniques for the amateur/hobbyist is the complexity of the maths involved. Those of us who have never done or have long forgotten medium level calculus and related subjects will find some aspects of the field heavy going.

Complex hardware design considerations

Real time processing of the type called for in DSP techniques can necessitate a lot of processing power which invariably manifests itself as high processor clock speeds and bus data rates. Veroboard is largely out of the running.

Expensive development tools

In the commercial arena where high productivity is crucial, high quality development tools are mandatory. These can be very expensive depending on the systems in use and hence prohibit many smaller firms from making use of this technology. For the amateur, access to these tools may not be so crucial as by nature of experimentation a suck-it-and-see approach is often quite acceptable and generally more fun!

High component cost

In simple applications, the relatively high cost of DSP chips and their associated support devices is not warranted. A system which requires nothing more exotic than a simple R-C filter is not a good candidate for DSP.

As device costs are quite high the experimenter can be placed in something of a dilemma when considering developing hardware from the ground up as an incorrect design could ruin a $100+ device.

Inability to deal with very high frequency signals

DSP systems rely on accurate quantised digital data and as such must be able to sample the signals in question at a minimum of twice the signal's highest frequency component (Nyquist's theorem) Cheap A/D and D/A devices stop at sample rates of the order of 5-10 MSPS (Million Samples Per Second). Sample rates higher than this call for specialised components which are inevitably high in cost.

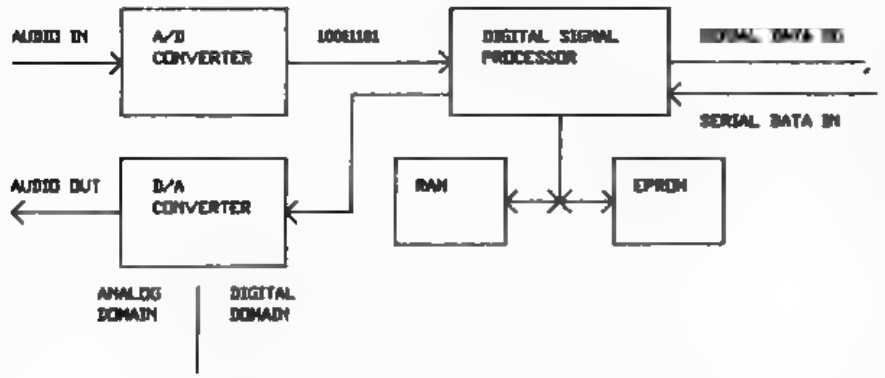


FIGURE 3 SIMPLE DSP BASED MODEM

Some common DSP applications

Radio and Telephone Communications

DSP is an ideal choice for use in radio or telephone communications applications. Figure 1 shows a simple DSP system. Minimal hardware can be added to this as shown in Figure 3 to provide us with all the necessary hardware to construct a complete and very versatile DSP based modem. The versatility of a system like this comes from the underlying nature of DSP systems, that is that everything is done within the digital domain using a number of mathematically derived algorithms. This modem with appropriate software is then able to handle virtually any kind of modulation technique desired, FSK, PSK, PAM etc.

For the amateur this can be a real boon as only one common hardware design is used and changes to the software do the rest. The soldering iron, oscilloscope and junk box has been replaced by maths and programming.

A group of amateurs in Finland have developed a general purpose DSP board and appropriate software which will allow experimentation along the lines of the above. This board is based around the popular Motorola DSP5600I chip, a device which allows up to 56 bit resolution (336dB) at upwards of 20MIPS (Million Instructions Per Second) at 40MHz clock speed. As a brief sideline, an IBM PC compatible using a Intel 486 processor at 50MHz runs around 10 MIPS. There is documentation available on these boards and some Australian amateurs are looking into producing these boards once the design has been finalised. Further information can be obtained from the author or through the Canberra Amateur Packet Radio Group (CAPRG)

Test and Measurement

DSP techniques are being used extensively in the area of test and measurement. Most modern digital oscilloscopes, spectrum analysers, time domain reflectometers, radio test sets and the like make use of DSP to some degree.

Domestic and Professional Audio, Musical Instruments

One of the larger growth areas in DSP is within the audio/music field. A now commonplace example of DSP is in the humble domestic CD player which uses simple DSP techniques as part of the process of recovering the high quality audio which has made CD so popular.

Most professional recording studios have embraced DSP as the best way to provide a level of recording quality and digital effects (echo, reverberation etc) that was inconceivable using analogue systems.

DSP based signal processors (so called effects units) have now moved down-market as well with astonishing quality being available from units costing under $300. Modern day electronic musical instruments use DSP almost exclusively to provide very high quality reproductions of acoustic instruments such as piano, strings, brass and woodwind etc. Synthesisers, which use what amounts to wave form synthesis to create purely electronic timbres have moved forward in leaps and bounds since the evolution of DSP.

A Practical Example

In this section a comparison will be made between an existing analogue based system and an equivalent system implemented using DSP techniques. This example is taken from work recently performed by Newton Pty Ltd, a Canberra based electronics engineering and manufacturing firm.

The client specified a cassette based voice logging recorder and desired a number of fairly unique features. Of particular relevance for the purpose of this study was the following.

- Voice activated recording — with an audio delay to prevent loss of information during tape start-up.
- Time and Date recording — each time a voice message was logged it was desired that the device would record the current date and time onto the tape in addition to the message itself. It was re-

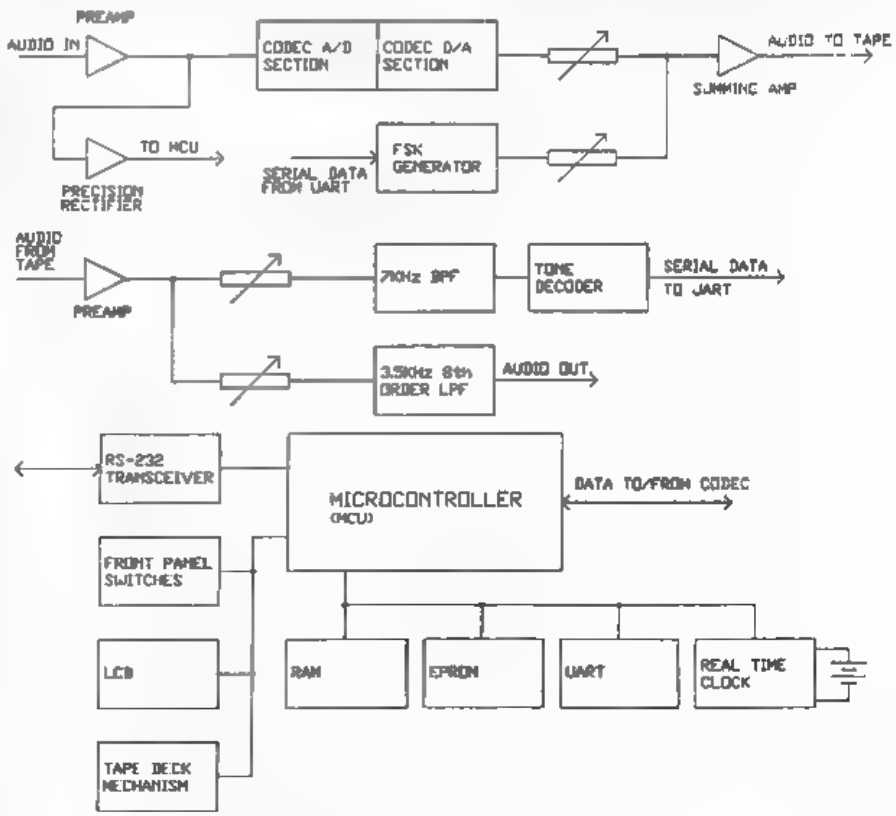


FIGURE 4 CASE STUDY BLOCK DIAGRAM

quired that this time stamp be inaudible during playback.

- Long recording time — an auto reverse, four track cassette deck was used to enable the system to record up to 180 minutes of messages on to a 90 minute cassette.

Figure 4 shows a block diagram of the system that was designed.

Rather than go into full details of the circuit operation, we'll just note that using analogue techniques, the above circuitry requires around 200 components and approximately half an hour to perform the calibration required for correct operation.

Figure 5 shows the block diagram of the DSP based equivalent to Figure 4.

Functions that were originally performed by the microcontroller can now be taken over by the DSP device which at the sample rates in use still has sufficient processing power left over.

By using a DSP system the component count is considerably reduced as well as the amount of calibration time required.

The software required to roll all these functions into one device is far from trivial and it was this factor which led our company to use an analogue/digital hybrid as shown in figure 4 instead of the DSP based system in figure 5. Had the relevant DSP programming expertise been available in house it would have been cost effective to implement the system using the DSP solution.

This particular example can be considered something of a borderline case. Manufacture cost of the finished system would have been lower due to lower component count and resulting lower labour costs however as explained above, the development difficulties meant the use of DSP techniques would not have been cost effective.

Conclusions

Digital Signal Processing is a field which lends itself to experimentation for those with an interest in computers and programming as well as the amateur radio operator who has a degree of computing skill.

DSP is a complex field with its own set of design considerations, rules and theories. It will undeniably play an important role in the future of all technology based fields.

References/ Acknowledgments

This paper was prepared from many books and documents read by the author over the last couple of years or so. In particular the following references were found to be useful.

DSP CARD 3 Beta version documentation by Kaj Wiik, OH6EH and Jarkko Vuori, OH2LNS, Alef-Null International 4-9-1991.

Motorola Corporation Data Sheets and Application notes for that company's range of DSP products.

PC-DSP by Oktay Alkin (Prentice Hall), an excellent combination of a textbook and PC software disk that lets you do many DSP functions on your PC and plot graphs of the results etc.

As an aside, if you are considering purchasing books on DSP and related subjects I would counsel you to read them a bit first, particularly if you're not all that mathematically inclined. Many texts, quite reasonably, use mathematical proofs and calculus to get the point across. If you don't understand the maths I've found the point is easily lost. ar

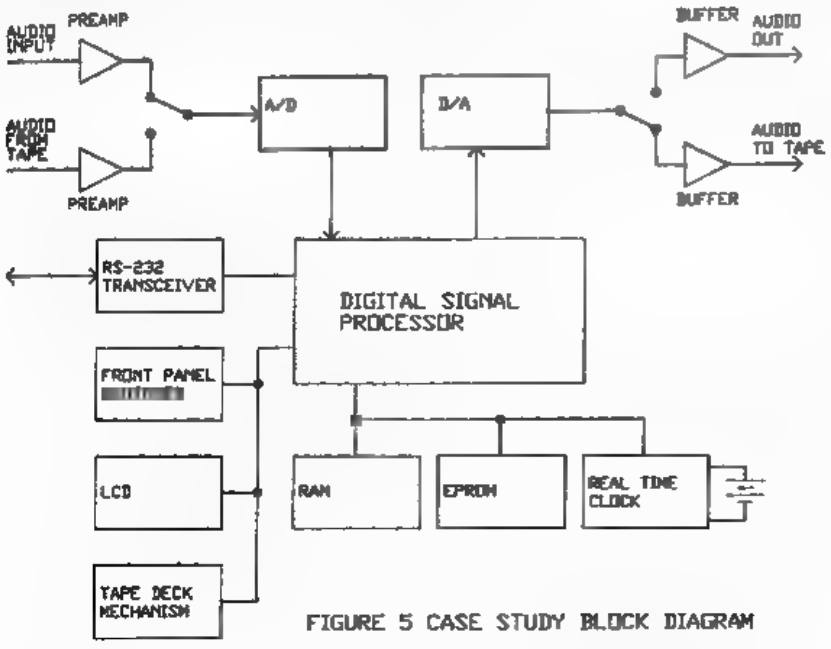


FIGURE 5 CASE STUDY BLOCK DIAGRAM

Club Corner

Moorabbin and District Radio Club

Amended Rules for the M&DRC Award.

The scoring system for the club's very attractive award has been amended by the allocation of three points for a contact with one of the club's life members.

The complete details of the award are as follows:

1. This open award is available to any licensed amateur who has submitted evidence of two-way contacts with M&DRC station VK3APC and/or member stations (identifiable by call sign); and to any SWL who submits evidence of having heard contacts between amateurs and members stations.
2. Contacts may be made on any band and any mode.
3. The Award is issued on a point scoring system; Club Members — 20 points required; Non-Club Members — 15 points; SWLs eight (8) points; Overseas Stations five (5) points or one (1) contact with the Club Station VK3APC.
4. Awarding of points is based on the following schedule; for each contact.

	Mode of Contact			
Station	Phone	CW	Packet	RTTY
VK3APC	5	10	7	5
M &DRC Member	1	5	5	4
Life Member	3			

Stations may only be worked once per band, per mode. A separate award may be claimed for each mode qualified for.

5. Contacts made as from 1st June 1983 are valid for Award points.
6. Proof of contact to be by log extract showing date, time (UTC), call sign of station worked, frequency, mode of emission, signal report, and points claimed.
7. Applications for Award to be sent to :
   Awards Manager
   PO Box 58
   Highett Vic 3190
   together with a fee of $3-00.
8. The M&DRC holds a regular club net on 3.567 MHz each Monday night at 8.00 pm local time.

Allan Doble
VK3AMD

CONTESTS

Peter Nesbit VK3APN — Federal Contest Coordinator
24 Sovereign Way, Avondale Heights, 3034.

Contest Calendar Mar-May 93

Rules are in the indicated issue.

Mar 6/7	ARRL DX SSB Contest	(Feb 93)
Mar 13/14	BERU CW Contest	(Feb 93)
Mar 20/21	John Moyle Field Day	(Feb 93)
Mar 20/21	BARTG RTTY Contest	(Mar 93)
Mar 27/28	CQ WPX SSB Contest	(Mar 93)
Apr 1	Poisson d'Avril Contest	(Mar 93)
Apr 3/4	SP DX Contest	(Mar 93)
Apr 9/11	Japan DX CW Contest	(Mar 93)
Apr 10/11	"King of Spain" DX Contest	(Mar 93)
Apr 17/18	SARTG AMTOR Contest	(Mar 93)
Apr 24/25	Swiss Helvetia Contest	
May 1/2	ARI (Italy) Contest CW/SSB/RTTY	
May 8/9	CQ-M Russia Contest	
May 29/30	CQ WPX CW Contest	(Mar 93)

BARTG RTTY Contest

This contest is sponsored by the British Amateur Radio Teleprinter Group, and runs from 0000z Saturday to 2400z Sunday, 20/21 March 1993. The object is to work as many amateurs worldwide as possible, on RTTY, on 3.5-30 MHz (WARC bands excluded).

Categories include single operator, multioperator, and SWL. Operation is limited to 30 hours out of the 48 hour contest period. Exchange RST plus a 3 figure contact number and time in GMT (full four figures). SWLs must show the call of the station heard, report of message sent, and call of station being worked.

Score 1 point per contact. Multipliers are the total number of countries worked on each band, and the number of continents worked on all bands (counted once only). Call areas within W/K, VE/VO, and VK each count as separate "countries", and continents are as defined for WAC. The final score equals QSO points x country multiplier × continents.

Use a separate log for each band, and include a summary sheet showing call, name, address, category, score, declaration, etc. Send logs to be received by 24 May to: John Barber G4SKA, 32 Wellbrook Street, Tigerton, Devon, EX16 5JW, England.

CQ WPX Contest

This contest is sponsored by CQ Magazine, with SSB on 27/28 March, and CW 29/30 May 1993. The contest runs from 0000Z Saturday to 2400Z Sunday, and the objective is to contact as many stations worldwide as possible on 1.8-30 MHz (except 10, 18 & 24 MHz).

Categories include: single operator (either single or all band), subdivided according to power (unrestricted, low power max 100W O/P, and QRPp max 5W O/P); and multioperator (either single or multitransmitter, all band only). Single operator stations are where one person performs all operating, logging, and spotting functions. The use of DX spotting nets places the station in the multioperator single transmitter category. Multi-multi stations must have all transmitters located within a 500m diameter circle or within the property limits of the licensee's address, whichever is greater. All antennas must be physically connected by wires to the station transmitters and receivers.

Exchange RS(T) plus a 3 digit number starting at 001. Continue to 4 digits if past 1000. Multitransmitter stations must use separate numbers for each band.

Score 3 points (14-30MHz) or 6 points (1.8-7MHz) for contacts with stations on different WAC continents, and 1 point (14-30MHz) or 2 points (1.8-7MHz) for contacts with stations within the same WAC continental boundary. Contacts with stations in the same country are permitted for multiplier credit but have zero point value.

The multiplier is the total number of prefixes worked on all bands (each prefix is counted only once regardless of the number of different bands on which it is worked). A "prefix" is the letter/numeral combination forming either the first part of the callsign, or else the normal country identifier for stations using their home callsigns in another DXCC country. For example: N8, W8, AG8, Y22, Y23, HG7, HG73 are all separate prefixes. The prefix for both N8ABC/KH9 and KH9/N8ABC is KH9. Portable designators without numbers will be assigned zero after the letter prefix, eg N8ABC/PA becomes N8ABC/PA0. Any calls without numbers will be assigned a zero after the first two letters, eg RAEM becomes RA0EM. Suffixes to indicate maritime mobile, mobile, portable, alternate location, and licence class do not count as prefixes (eg /MM, /M, /P, /A, /E). The final score is QSO points × multiplier.

Logs must show times in GMT. Show prefix multipliers only the first time they are worked. Logs must be checked for duplicates, correct points, and prefix multipliers. Logs must be accompanied by a sorted alphanumeric list of prefix multipliers, and a summary sheet showing call, name, address, category, scoring information, and a signed declaration that contest rules and radio regulations have been observed.

Logs may also be submitted on 3-1/2 or 5-1/4 DOS disk in ASCII format (.BIN, .RES, .DBF, .WKS also acceptable), providing a written summary sheet is included.

Send logs postmarked by 10 May (SSB) or 9 July (CW) to: WPX Contest, 76 N. Broadway, Hicksville, NY 11801, USA. Indicate SSB or CW on envelope.

A comprehensive range of trophies and plaques is offered, and certificates will be awarded to the highest scoring station in each category, country and VK call area. To be eligible for awards, single operator stations must show at least 12 hours operation, and multioperator at least 24 hours operation. Single band entries showing more than one band will be judged as multiband unless otherwise specified. Where returns justify, 2nd and 3rd place awards will also be made.

Poisson d'Avril Contest

Sponsored by the French organisation Legion International des Omelettes avec Oignons et Fromage, this old classic runs on Thursday 1 April from 0000 to 1954z. The purpose is to promote the humorous use of amateur radio for international goodwill.

All present regularly issued licensees, friends, and other licensed stations may take part. Exchange RS(T), serial number (actually any number you want), QTH (yours or that of anyone you choose), and birthdate (yours).

Stations may be worked on all bands as many times as possible, but only once per QSO. Count one point for each station heard, worked, or imagined. Bonus points may be claimed for working any amateur whose picture appears on the cover of an amateur radio magazine. Extra bonus points for making at least one QSO without using commercial, generator, nuclear, fossil fuel, battery, solar, chemical, biological, thermoelectric, or similar power sources. Other arbitrary bonus points may be claimed.

Every station worked or heard counts as a multiplier. Exception: Stations in Washington DC do not count as multipliers unless they have flown aboard the Space Shuttle. Stations contacted whilst on board the Space Shuttle count for Washington DC.

Suggested frequencies are 3526, 7025, 14025 (CW), and 3650, 3799, 7095, 14220 (SSB). The usual frequencies apply for other modes eg RTTY, AM/FM, SSTV, Packet, AMTOR, and telepathy.

Categories include single operator unassisted, single operator assisted, single operator multitransmitter, multioperator no transmitter, QRP, QRO, and really QRO. Clubs may claim any known participant without the usual meeting attendance requirement, in fact the existence of an actual club is not necessary.

Logs may be submitted on computer disk in anything except the standard contest format; 1GB optical R/W drive with warranty in factory sealed box preferred. All entries must include a signed declaration that the rules of the contest were obeyed at least once. Logs must be postmarked by 15 April 1993, and sent to: P d'A Contest Committee, 144 Kendall Pond Road, Windham, NH, USA 03087. Include SASE for results.

Awards will be made based on score, entry creativity, and amount of cash enclosed with the log. The decisions of the judges are arbitrary and final.

SP DX Contest

Held on the first full weekend of April, this usually has a good level of SP activity. Dates/times for 1993 are 1500Z Saturday to 2400Z Sunday, 3/4 April.

Classes include single operator, single and all band. Bands are 160-10m (no WARC bands). Send RS(T) plus serial number; SPs will add a 2 letter province code. Score 3 points per QSO with each Polish station, and obtain the final score by multiplying by the number of provinces worked (max 49).

Send log to arrive by 5 May to: Polski Zwiazek Krotkofalowcow, Contest Committee, Box 320, 00-950 Warsaw, Poland.

Japan DX CW Contest (High Band)

Running from 2300Z 9 April to 23z 11 April 1993, the object is to contact as many Japanese stations as possible on 14, 21 and 28MHz CW.

Classes include single operator (single and multiband), single operator QRP (5W max O/P), and multioperator single transmitter. Send RST plus CQ zone number; JAs will send RST plus prefecture number (01-50). Score 1 point per JA QSO on 14 & 21 MHz, and 2 points on 28 MHz. Points are doubled for QSOs with QRP stations (QRP stations must send /QRP). The multiplier equals JA prefectures + Ogasawara Isl (JD1) + Minami-Torishima Isl (JD1) + Okino-Torishima Isl. Rest breaks totalling 18 hours must be taken and clearly shown in the log.

Send log postmarked by 31 May to: Five-Nine Magazine, Box 59, Kamata, Tokyo 144, Japan.

"King of Spain" DX Contest

This contest runs from 18z Saturday 10 April to 18z Sunday 11 April 1993, 80-10m (no WARC), SSB and CW (these are separate contests requiring separate logs). Classes are single and multi-operator, multiband only.

Send RS(T) plus serial number; Spanish stations will send RS(T) plus province letters. Score 1 point per QSO with each Spanish station on each band. The multiplier is the number of Spanish provinces worked.

Send logs to be received by 28 May to: URE Contest Manager, PB220, 28080 Madrid, Spain.

Provinces are: EA1: AV BU C LE LO LU O OR P PO S SA SG SO VA ZA; EA2: BI HU NA SS TE VI Z; EA3: B GE (or GI) L T; EA4: BA CC CR CU GU M TO; EA5: A AB CS MU V; EA6: PM; EA7: AL CA CO GR H J MA SE; EA8: GC TF; EA9: CE ML.

SARTG WW AMTOR Contest

This one is sponsored by the Scandinavian Amateur Radio Teleprinter Group, and runs at the following times: 0000-0800Z & 1600-2400Z Saturday 17 April, and 0800-1600Z Sunday 18 April. Classes are single operator (all/single band), multi-single, and SWL.

Only AMTOR is allowed. Use FEC for calling CQ, and ARQ for contest exchanges. Exchanging messages in anything other than ARQ is not allowed and will be grounds for disqualification.

Exchange signal report, name, and serial number starting at 001. Score 5 points for QSOs with the same country, 10 points for QSOs with other countries within the same WAC continent, and 15 points for QSOs with other continents. Each DXCC country worked on a new band counts for a multiplier. VK/VE/W/JA call areas are considered separate countries for the purpose of QSO points and multipliers. Final score is total QSO points × total multiplier

Send entries postmarked by 9 June to: SARTG Contest Manager, SM4CMG, Skulsta 1258, S-710 41 Fellingsbro, Sweden.

Results of 1992 ARI International DX Contest

The 1992 contest was well patronised, with activity from some of the more exotic locations in Africa, Asia and South America. Australia was represented by two stations, both winning certificates:

CALL	MODE	QSOs	MULT	SCORE
VK2APK	CW	645	133	322525
VK5PMC	SSB	14	11	1463

73 VK3APN

Ross Hull Memorial VHF-UHF Contest, 1992-1993, Results

by John Martin VK3ZJC

Once again there was no really outstanding propogation during the contest. In my location there were several good openings to Adelaide, and marginal ones to VK6. The most notable contacts made during the contest were on 1296 MHz, from VK2DVZ to ZL1AVZ, and a new Queensland record for VK4KZR and VK4OE/2.

Some of the contest "regulars" — especially on the microwave bands were absent this year, and their ability to dole out points was sorely missed! Despite this, participation was higher than last year, especially on 2 metres. It was pleasing to hear a number of stations which I had never — or hardly ever — heard before.

Contest activity on 6 metres was quite low, partly due to conditions and partly due to the 10 point scoring limit. I do not see this as a problem — most 6 metre operators are more interested in chasing DX than collecting contest points anyway!

Again this year I logged a number of interstate stations whose calls went unanswered because of local QRM on calling frequencies. It was also disappointing to miss a few "juicy" contacts due to locals nattering or testing on 1296.1 MHz. I must say again: DX calling frequencies are not the place for local contacts, deaf receivers, FM-only receivers, vertical antennas, or test transmissions.

Logs were well presented and very easy to check. Several entrants will find that their points score has been altered. In every case this was due to underestimates of distance or errors in adding up the totals — and in every case the entrant has gained from the correction.

Results

Now down to business. Roger Steedman, VK3XRS, has won the trophy for the third successive year, with the top score on all but three bands. Gordon McDonald, VK2ZAB, wins 2 metres with a superb score. Ian Berwick, VK3ALZ, takes out 2.3 GHz and Wal Howse, VK6KZ, likewise for 10 GHz. Congratulations to all.

Next Year

Several entrants commented that scoring was complicated by the 1800 UTC start to each contest day. The idea of the 1800 start was to shift activity from the mornings to the evenings. On checking the logs I cannot see that it has made much difference, so it could be best to go back to the 0000 UTC start

I will also look into possible changes to the 6 metre scoring so that long distance scatter contacts can be better rewarded.

There was some complaint about the need to keep separate totals for each band. The purpose of this was so that awards could be made to the top scorers on each band as well as to the overall winner. By nominating different days on different bands, entrants can claim the highest possible score on each band as well as the highest aggregate.

I am reluctant to drop the band-by-band scoring, because it would mean less incentive for people who prefer to concentrate on one or two bands. There should be no problem in making separate totals — the easiest way is to have a separate score column for each band, and a "master sheet" where the daily totals for each band can be entered. At the end of the contest it should then be easy to pick the best seven figures in each column.

Christmas Day 1993 will fall on a Saturday, so I am undecided as to whether it would be better to shorten the contest by one day and start on Boxing Day. This would avoid the possibility of frustration, guilt feelings or family conflicts on Christmas Day!

VHF — UHF Field Day 1993

Due to the problems with the delivery of "Amateur Radio", some entrants may not have received enough notice of the rules and the deadline for logs, which was earlier than last year's. I feel the only fair thing is to extend the deadline to the end of March and publish the results in the May issue.

73, VK3ZJC

1992 VK/ZL Oceania DX Contest

John Litten ZL1AAS

I have just finished checking the logs submitted in the VK and ZL sections. Who said CW was dead? In this time of difficult propagation conditions, just take a look at the leading scores.

Call	Name	6 m	2 m	70 cm	23 cm	13 cm	3 cm	Total
VK3XRS	R. Steedman	964	2328	2114	1190			6596
VK6KZ	W. Howse	215	1816	1743	160		96	4030
VK2DVZ	R. Barlin		2538	534	470			3542
VK2ZAB	G. McDonald		3488					[illegible]
VK3CY	D. Clarke		2244	1232				3476
VK5AKK	P. Helbig	161	1864	1337	80			3442
VK3AFW	R. Cook		1488	1288	600			3376
VK3DLM	L. Mostert	458	1236	1078				2772
VK3AUI	G. Sones		140	920	903	540		2503
VK3DEM	R. Ashlin		1028	671	200			1899
VK3ALZ	I. Berwick	155	538		440	26		1159
VK3ZJC	J. Martin				920			920
VK2XMD	M. Erskine	518	320	7				845
VK3AEX	R. Antosiewicz	20	244					[illegible]
VK2NJ	I. Thomas		204	14				218
VK6BWI	P. Parker		152					152
VK4GWC	G. Combes		28					[illegible]

I do not recall when a score of over 2 million points was last achieved. Congratulations are due to Peter, ZL3GQ for this magnificent effort (by the way, his computer generated log was a joy to check). First place overall in the Phone section, and runner-up overall in the CW, is well known and long-time contest entrant, VK2APK. Congratulations Dietmar

As I usually do, I have prepared the results to show the individual band scores, as well as the All Band total.

Some entrants may find that their score has altered, but in most cases, this has been due to mathematical errors in their calculations. Again the comment I hear from overseas .. where are all the ZLs?

The results in the Overseas section will, of course, be some months away.

Some comments from contestants I enjoyed the non-stop 80m. pile-up which followed the sunrise from USA East coast to West coast ... ZL3TX.

I was slightly disappointed by the number of VK/ZLs who were prepared to give me a number, but could not be bothered with joining the contest ... VK8AV.

My first serious attempt at a 24 hour test, and enjoyed it ... VK5AFO.

Better propagation, and a few extra watts "up the stick" would have helped ... VK2ARJ.

Would be nice if there were sections for Novice and single band operations, but all in all, a good 24 hour contest ... VK2PWS. Conditions reasonable across the bands, but where were all the VKs and ZLs on 160 and 80 metres? .. ZL1AIZ.

A most enjoyable contest with excellent decorum, and a credit to the great majority of "Brass Thumpers" Who said Morse was under threat? ... VK5AGX.

As usual a very good contest and most enjoyable despite limited time on the air. Been in it for many years and hope to be there next year ... VK4OD.

Enjoyed the contest. Lots of fun .. VK4OR.

It is the WIAs turn to organize this contest for 1993, so I will look forward to meeting you all again soon.

1992 VK/ZL Oceania DX Contest — Australian Results

	160m	80m	40m	20m	15m	10m	TOTAL
VK Phone Results							
VK2APK	2000	17000	38000	59334	98530	31488	1554293
VK2AYK	2500	1280	900	63336	34322	4896	456148
VK2ARJ	60	770	20	8640	966	585	46996
VK2CJH	1080	2340		81			13209
VK2PS	2000	540		2200	1716	48	52530
VK2PWS					100806	76230	356963
VK2XT					14784		14784
VK3DRX	3920	1530					10950
VK3DZM		268800					268800
VK3ENX		10	45		1450		2407
VK3SM				812			812
VK4DMP		3420	100	1156	132354	144	263097
VK4NEF		630			58088	3	74965
VK5AFO	1600	6290	180	7275	6956	3648	195480
VK5PMC		1710			38760		59500
VK6WJH		5400	5	1292	13020		84851
VK8AV		1710	20	11656	116564	29475	491381
VK8BE					646		646

Check Logs: VK3OOF, VK5OE

	160m	80m	40m	20m	15m	10m	TOTAL
VK CW Results							
VK2AIC		660		754	828	336	13166
VK2APK	1200	54870	209820	64264	37800	8832	1872520
[redacted]		3840	25665	10664	6750		195494
VK2PS	800	2090	2520	6298	680	504	85918
VK2KM	560	13120	112690	924	26732	1650	554554
VK9NY/2			107800	36207	12198	3192	533544
VK3DRX	640	880					3240
VK3KS				342			342
VK3VB	180	1900	15	1120	684		22308
VK3XB		160		6633	288		13529
VK4LV		840		1677	4056		19497
VK4OD				9594		2574	23328
VK4OR		600	405	8346	2400	1173	56980
VK4TT				129564			129564
VK4XA						129213	129213
VK5AGX					55176		55176
VK6BB		120	18460	4575	41128		190476
VK6HG		910	8800	23128	30940	3402	286396
VK6IV			6600				6600
VI6ZH			18975	48199	135026	9798	707229
VK7RY		1530	150	272	8		7072
VK8AV	160	490	54810	68056	73200	56238	1168512
VK8BE					576		576
[redacted]							
VK3 SWL Jon Finn							5000
VK6 SWL Peter Kenyon							42048

ar

IARUMS — Intruder Watch

Gordon Loveday VK4KAL Federal Intruder Watch Co-Ordinator
Freepost No 4 Rubyvale Qld 4702 or VK4KAL@VK4UN

The International Amateur Radio Union Monitoring System (IARUMS) is set up to record, report, and encourage the removal of non-amateur stations from amateur band allocations. Stations targeted are usually broadcast or commercial stations from other countries. Priority is not given to local "pirates". Each country appoints a Co-ordinator, who is responsible for collating reports and forwarding them to the appropriate regulatory authorities (DoTC in Australia)

Each WIA Division, apart from VK3, has a Divisional Co-ordinator to collect reports from that Division and forward them to the Federal Intruder Watch Co-ordinator. The main strength of the service is in the individual amateurs who spend time regularly listening on the bands and identifying types of signals and stations.

More Intruder Watch listeners are always required. Volunteers who contact either their Divisional Co-ordinators or me direct will be supplied with information, log sheets and tapes to assist in identifying modes.

The most persistent intruders being observed are from the CIS [formerly USSR]. Stations identifying as UMS are controlled from Moscow Naval Radio on 21031.5, mxd modes, A1A/F1B, 200/250 Hz. A careful check should be kept on 21448 A3E. This was recently signing Radio Moscow, but possibly now identifies as Radio Armenia. It usually has a lot of splatter associated with it.

As from 1st October 1992, Radio Beijing on 24.950 MHz has been using the call sign "China Radio International", retaining former ID for local services, but keep an ear open. No change expected either with removing harmonic or ID. Many more pulse and carriers are being observed over the last few months, some more time is indicated, for a possible callsign.

The VK end of IARUMS is still looking for Co-ordinators for VK3 and possibly VK2, as no reply has been forthcoming from that Division The IWS is not restricted to male domination, I am sure there must be YL operators more than capable of doing the job. The Service, suffers to some degree, by not being fully staffed. How about it "girls"?

STOP PRESS

On behalf of the Region 3 Co-ordinator ZL1CVK, I wish to thank all participants in the recent Beacon Survey. In VK we had a "strike rate" of 100%, 15 reports in all. To my knowledge no one opted out, your efforts are much appreciated. Can we get the same "strike rate" with our normal IW logs?

73
Gordon

ar

Awards

John Kelleher VK3DP Federal Awards Manager

Swedish Awards

I recently received a copy of the official Swedish Awards Program from the Sveriges Sandareamatorer (SSA).

Heard all Sweden Award (HASA)

The HASA will be issued to all listeners (SWLs) for verified reports of stations in Swedish lans and call sign districts for contacts made after 1st January 1988.

The award is issued in the classes and groups corresponding to the rules for the Worked All Sweden Award (WASA).

Plaques will however not be issued for the HASA.

Swedish Locator Award (SLA)

The SLA will be issued to licenced radio amateurs for verified contacts made with the various locator squares in Sweden, as defined by the Maidenhead system, for contacts made after 1st January, 1988.

The award is also issued to listeners (SWLs) on an equivalent basis.

All amateur radio bands may be used.

Endorsements can be obtained for individual bands and modes.

Requirements

Basic Award 25 Squares
Stickers 35, 45, 55, 60, 61, 62, 63 and 64 squares.

General

The SSA Awards Programme is available to all licensed radio amateurs and SWLs worldwide, who are members of their country's IARU affiliated radio society *(ie for Australian amateurs and SWLs, members of the WIA — VK3UV Prod Ed).*

All contacts shall have been made from the same country.

Contacts with earth-based repeaters are not valid.

All contacts shall be verified with QSL cards or equivalent, on which there is sufficient information which is required for approval.

Instead of sending in QSL cards, overseas applicants may get their cards checked by an official of their National Society.

Fees

A fee is charged per award and is to accompany each application.

Basic Award	6 IRC
Sticker	1 IRC

All applications shall be sent to Sveriges Sandareamatorer, Ostmarksgatan 43, S-123 42 Farsta, Sweden.

DXCC Profiles — Bill Hempel VK4LC

Prior to 1957, Bill was an RAAF officer. He retired to take up farming at Kyabram, in Victoria. Later he joined the Public Service, and held responsible positions in Canberra. He was Federal Awards Manager on two occasions, his way of putting something back into the hobby which he enjoyed so much. In 1962 he was first to operate SSB from Wallis Island as FK8BH, later to Nauru (VK9BH), Ocean Island (VR1N), New Hebrides, now Vanuatu (YJ8RH), and Portugese Timor (CR8BH)

After Bill retired as Parliamentary Liaison Officer (Defence), he moved to Mount Tamborine, Queensland, an ideal HF and VHF location, (using the latter to advantage on 432 and 144 MHz). He now looks to working satellites, and the occasional shuttle operation.

His personal advice to others is similar to those already published:

1. Listen, listen, listen.
2. Exhibit patience, and show consideration to others.
3. Always be sure that your equipment, including antenna systems, are in good operating condition.
4. Don't operate outside your own limitations.

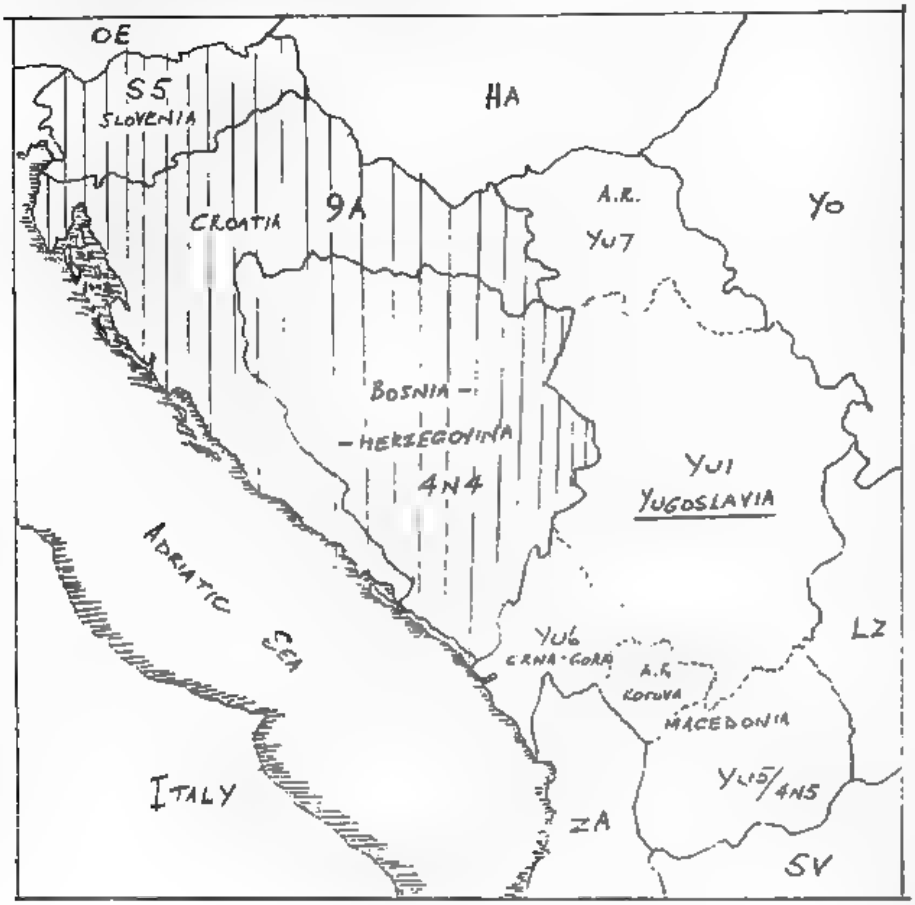
Note: During the early 1950s, I had the pleasure of associating with Bill, as a fellow RAAF operator, at School of Air Navigation, East Sale, flying in Lincolns and Dakotas. When I arrived there, as a "new boy", he was the first to offer a helping hand.

Bill Hempel VK4LC

Bill VK4LC's extensive antenna system at Mount Tambourine.

Blunder

Production Editor's Note — In last month's Awards Column, (page 59) reference was made to a map of the new Slovenia, Croatia and Bosnia-Herzegovina countries. Regretfully I must have been away with the fairies on the day of putting the magazine to bed, as the map was accidently omitted. The map is published hereunder. Apologies to all — VK3UV.



Spotlight on SWLing

Robin L Harwood VK7RH 52 Connaught Crescent West Launceston Tas 7250

Well, Autumn has arrived and signals are coming in earlier now on the Long Path from Europe and North America. Don't forget that the M93 period commences on the 1st of this month at 0100z, yet the majority of alterations will take place on the 28th, when continental Europe goes on to Daylight Saving.(Incidentally, we go off Daylight Saving on the same date in VK7.) Most international broadcasters generally make significant alterations now on the last Sunday in March and September, instead of the first.

Radio Netherlands had hoped to commence relaying their programming from sites in the Commonwealth of Independent States (CIS) as from January 1st. However, a combination of weather and technical difficulties held it back until the 1st of February. At 1030 UTC, a very good signal from Irkutsk, Siberia was heard on 9850 kHz with English to Asia. On 7260 kHz, the same program was heard, although 600 milliseconds behind Irkutsk. Signal strength was fair and frequently subject to heavy QRN and splatter. This sender is at Petropavlovsk, on the Kamchatka Penisula and is for the Far East. It goes off at 1125, while 9850 kHz continues in Indonesian from 1130z. I believe that Radio Netherlands via the CIS is on for up to 17 hours daily.

The new Catholic owned "Eternal Word Network", based near Birmingham, Alabama, which operates Radio WEWN, has run into serious problems. Firstly, the community didn't take too kindly to the erection of antennas and associated power lines spoiling the view etc. Then, when the transmitter started up on the 27th of December on 7465 kHz, it caused severe RFI problems to the residents, who couldn't utilise their phones or receive domestic radio and television programming, plus locking up the Birmingham Police Two Way on 159 MHz.

Also, there are rumours that funding that they were hoping for, may have fallen through. After only a few days, the sender was closed down and WEWN hasn't been heard since. When it was heard here, reception was very poor on 7465 due to heavy QRM from an Australian utility with Frequency Division Multiplex (FDM) service two kHz down.

Radio Australia has commenced a special service to Somalia on 25750 kHz between 0800 and 0900 UTC. It includes a special program specifically for the Australian troops there plus the normal Radio Australia programming.

Here is the schedule for the Voice of America's English Transmissions to Asia and the Pacific, as received on the local Packet BBS from IW1PRT. It is current till 27th March.

0000-0030 7120-9770-11760-15185-15290-17735-17820
0030-0100 7120-9770-11760-15185-15290-17735-17820
1000-1100 5985-11720-15425
1100-1200 5985-6110-9760-11720-15155-15425
1200-1230 6110-9760-11715-15155-15425
1230-1330 6110-9760-11715-15155-15425
1330-1400 6110-9760-15155-15425
1400-1500 6110-9645-9760-15160-15425
[illegible]
2100-2200 11870-15185-17735
2200-2400 7120-9770-11760-15185-15290-15305-17735-17820

Well, that is all for March. Until next time, the very best of monitoring and 73 — VK7RH.

Repeater Link

Will McGhie 21 Waterloo Cr Lesmurdie 6076 VK6UU@VK6BBS

Perth Pagers

Access to a spectrum analyser prompted me to connect an aerial to it and have a look at the pager band just above the two metre band. What a sight, wall to wall pagers. The accompanying drawing is a 30 second sample of pager activity. At any instant about half of the pager transmissions shown are on air. The spectrum analyser has a delayed persistence capability and allows a time lapse picture to be built up. This drawing is the result.

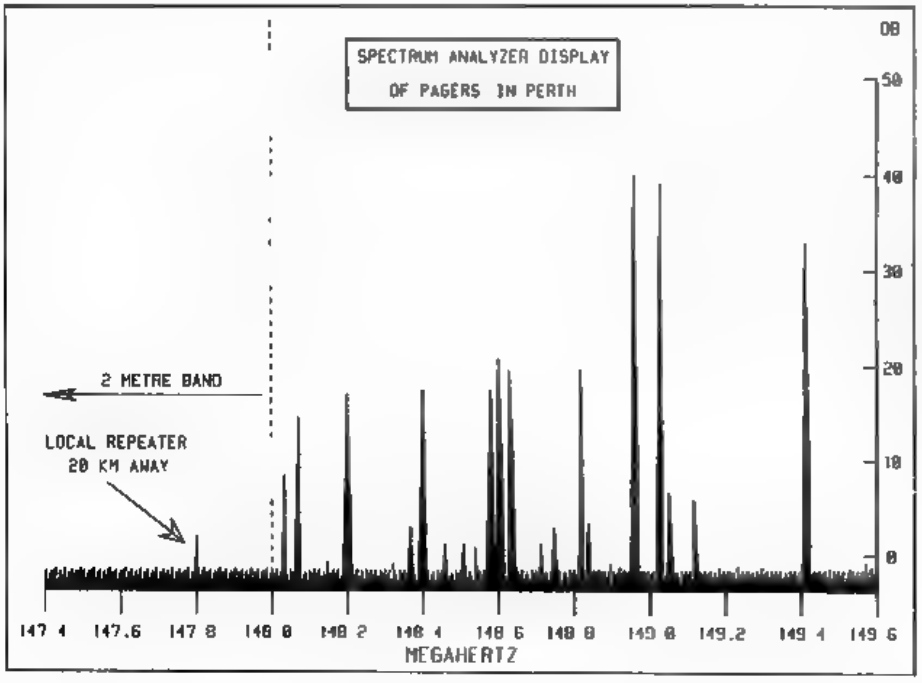
The pagers were received on a quarter wave whip about 10 metres high and a couple of kilometres from the centre of Perth. The strongest pagers shown are located in the Perth city area, the others, unknown distances away.

Note the amateur repeater signal shown. This repeater is VK6RAP located about 25 kilometres away. The frequency of the repeater shown is not correct, I moved it up the band for ease of representing it on the drawing.

The vertical scale is in dB and shows what your receiver has to contend with in the inner city area; signals 40 dB stronger than the amateur repeater signal. It is little wonder that many amateur two metre receivers have intermod problems in such a strong signal environment.

Looking at these pager signals coming and going over a period of time on the spectrum analyser, demonstrated how clean they are. No spurious signals at any time including the critical switch on and switch off times. Blaming dirty pager transmissions for our problems on two metres could be largely dismissed as a waste of time. Any piece of technology can fail but if you are having problems with pager transmissions then suspect your receiver long before the pager transmitter. How the decision to place high power high density transmissions so close to our two metre band was arrived at will never be known, but wouldn't you love to have been there to find out. Maybe we were never mentioned, maybe no one knew that an amateur band existed from 144 to 148 MHz. By the way I'm not knocking pagers as such. The technology is great, and the purpose they serve very useful. Does any one know where the rest of the world puts their pagers? Are we the only country with them right up against 148.000 MHz? If you know please let me know, I'm curious.

Also I would like to know how to spell ANALYSER or is it ANALYZER?



Production Editor's Note

1. *Pagers — Please refer to last month's issue, for our Federal President's (Ron Henderson VK1RH) most interesting comments.*
2. *Analyse/Analyze — So would I Will, the spell checker on our Word Processor (WP51) tells me that "ANALYSE" is valid, but our copy of Heinemann's Australian Dictionary shows both are correct. Of course the word "analyse" or "analyze" is a verb, and as both are correct in this sense, one would assume the conversion to a noun would also be correct. Bill VK3ABP didn't help much by claiming "analyzer" to be American spelling and "analyser" to be British, so either may be correct depending on which convention you wish to follow. I guess we will have to await more profound discussion from our correspondents. In the meantime, I will just put it down to one of those "amateur conundrums", and leave our readers with the choice of either ... VK3UV.*

ar

Stolen Equipment

YAESU FT209RH with Broken battery clip and a large scratch on back near belt clip. Details to VK6KAD.

YAESU FT230R two metre FM mobile rig, Serial No 2M120897, stolen from vehicle in Church St, Rozelle, NSW, between 8.00am and 5.30pm on 10 Feb 1993. Reward offered for return. Details to Balmain Police, and Colin Christie VK2JCC, QTHR (02) 476 2651.

mr

ALARA

Robyn Gladwin VK3ENX Box 438 Chelsea 3196@VK3YZW

The main news for the next few months will be the progress of plans for the ALARAMEET in Castlemaine, Victoria, 1, 2, 3 October, 1993.

There are 64 names to date, 31 ALARA members. Nine rooms have been provisionally booked at the Castle Motel and the $20 deposit for motel rooms is now required.

A suitable venue for the weekend has now been found and catering arrangements have been finalised already.

Proposed Activities

Friday: Meet 6.30 pm for evening meal (optional).

Saturday: Check-in from 9.30 am Welcome 11 a.m. Lunch 12 noon. Guided tour(s) 1.30 to 4.30 pm. Dinner 6.30 pm followed by social evening.

Sunday: Meet 9.15 am Tour(s) morning tea included. Lunch 12.30. Wind up official program. For those staying on, a further tour could be arranged if required.

The ALARAMEET Co-ordinator, Margaret Loft, VK3DML, is looking forward to hearing from anyone still hoping to attend. She will accept bookings until September BUT accommodation may be a problem later in the year. Her address is 28 Lawrence Street, Castlemaine, Victoria, 3450.

March and April are important months for contests arranged by DX YL organisations.

CLARA & Family HF Contest

Tuesday, 16th March 1700 UTC to Wednesday, 17th March 1700 UTC.

Open to all licensed amateurs, SSB and CW modes. Use all HF bands.

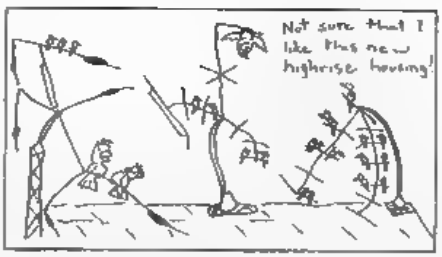
Single operator stations only. Each station may be contacted once in each mode. Logs are to reach the Contest Manager no later than 31st May, 1993.

Contest Manager: Janis Cameron, VE7AAP, 3528 11th Avenue, Port Alberni, BC. V9Y 4Y7 Canada.

WARO Thelma Souper Memorial Contest 1993

Saturday, 3rd and Sunday, 4th April, 0700 to 1000 UTC each day.

80 metres only, phone and/or CW. YLs contact YLs and OMs, OMs contact YLs only One contact with each station in each



half hour period is permitted. To qualify as a multiplier, WARO member stations must have contacts with at least 20 different stations. Bonus station using WARO callsign ZL2YL counts as a multiplier once each night. Logs to reach Contest Manager, Chris Armstrong, ZL1BQW, PO Box 209, Kawerau, BOP New Zealand, no later than 6th May, 1993.

DX-YL to North America YL Contest

24 hours maximum operating time with no breaks.

CW: 1400 UTC Wednesday, 14th April, to 1700 UTC Thursday, 15th April.

SSB: 1400 UTC Wednesday, 27th April, to 1700 UTC Thursday, 28th April.

Logs, postmarked within 30 days of the contest, to be sent to Carla Watson, WO6X, 473 Palo Verde Drive, California 94086 U.S.A.

Thank you to Dorothy Bishop, VK2DDB, for this month's cartoon.

33

Silent Keys

The WIA regrets the passing of :

L	Carras	L20754
R (Robert)	Roach	VK2ARI
J V (Jack)	Clifford	VK2DDN
C V (Claude)	Smeal	VK2DXO
B (Bert)	Saunders	VK2FDM
L P (Lester)	Gerity	(ex) VK2KT
R E	Barlow	VK2PPU
K R C (Kenneth)	Lawson	VK2PYP
F (Fred)	Taylor	VK3CFT
C (Charlie)	Case	VK4IQ
K J	Cahill	VK5KC
L A (Alyn)	Maschette	VK6KWN

Obituary

Due to increasing space demands obituaries should be no longer than 200 words.

Harry Hocking VK2HH

It is with regret we record the passing of Harry Hocking VK2HH on 9 December 1992 at the Calvary Hospital, Kogarah, after a short and sudden illness, at the age of 72 years.

Harry trained at the Marconi School of Wireless in Sydney, then made his career as a professional radio officer. First serving a few years in the Merchant Marine in WWII before being appointed by Qantas as an RO, flying first in Catalina then Sunderland flying boats.

He continued this career through various Qantas aircraft until the use of radio officers was discontinued with the advent of the 747.

Harry continued on ground-based training duties, but with many interesting flights to evaluate new radio systems.

Claude Vincent Smeal VK2DXO

Claude passed away on 1/1/93 at the age of 74 years following a long illness, leaving behind his devoted wife Kathy and three daughters, in addition to many friends.

He was in the Permanent Army for 35 years, rising to the rank of Lieutenant Colonel. He served in the South West Pacific and Darwin during the 1942 raid.

During the period 1951-1954 he was Battalion Signals Officer in Korea and, without being able to train, he completed the distance in the 1952 Helsinki Olympic Marathon; also he had three years in administration at an atomic weapons testing site, and five years administration at Williamtown with the Parachute Battalion, making his first jump at age 44. He was also a Legatee at Newcastle.

He gained his AOCP in 1979 despite suffering a stroke in 1977, joining the Coral Coast Guard in June 1990.

With Kath, he travelled in their mobile home extensively, visiting many of the group's members and other friends in Queensland and northern NSW

Our sympathy is extended to Kath and his daughters, and we will remember his Olympic spirit and the very strong desire to help others.

Les VK2AXZ

Charlie Case VK4IQ

Charlie was born in Charters Towers, NQ, in 1916 and at the age of 13 years, moved to Townsville with his family.

He was a motor mechanic for just about all his working life, with a great interest in radio as a result of a short period of employment with Stephenson's Radio from about the age of 15 years until his apprenticeship into the motor trade.

Radio as a hobby continued and, in 1969, he gained his AOCP after attending classes conducted by the Townsville Amateur Radio Club. He was very proud of being part of the amateur radio service, was a tireless experimenter with projects such as VFO stability, CW keyers, antennas and so forth.

After Cyclone Althea devastated Townsville in December 1971, he became a member of the State Emergency Services in the communications section, then became involved with WICEN, particularly with the Sunday morning calls-in on behalf of the Townsville region.

Finally, after years of battling illness, increasing pain and malaise made it necessary to stand down from his WICEN activity.

He was a devoted husband to Esther, his wife who, herself handicapped by disabilities, depended so much on him. Despite his own increasing illness into terminal stages, he looked after all her needs until he could go on no longer and, sadly, he passed away on 7 December 1992, aged 76 years.

To Esther and the family we extend our deepest sympathy. I can only say that knowing Charlie has enriched all our lives in many ways.

Ron Tulloch VK4BF

John Vincent Clifford VK2DDN

Jack VK2DDN, died in Orange on Friday afternoon 22 January 1993. He suffered no pain, only feeling sick, needing to get out of his car and relax. His friend Ray, visiting from Grafton, called an ambulance, but they could not revive Jack, who passed away in peace.

He was born in Strathfield on 5 August 1924 and had a very full and interesting life. At 19 he joined the RAAF and was sent to Canada for training. He flew over 48 missions as a Wireless Operator/Gunner in Lancaster bombers with 464 Squadron attached to the RAF in Britain. Naturally he became proficient in Morse.

Jack lived in many parts of the state during his long service with the Lands and Justice Departments, retiring as Clerk of Petty Sessions at the Orange Courthouse in 1979. He was first licensed as VK2NOF in 1977.

Some of Jack's activities included bushwalking, nature study, local and mining history, camping, bike riding, boating, current affairs, being a very good listener, cross-country skiing, experimenting and talking via amateur radio, radio-controlled flying model aircraft, painting and lots of other interests suited to the bachelor lifestyle. And he really was a gentleman.

Jack VK2DDN will not be forgotten by his friends in any group with which he had contact, especially radio amateurs and the Orange club members. His impish grin, his fiendish cackle, his love of cups of tea, interest in and loyalty to the club, his encouragement and help for all are legendary and will be most sadly missed.

His funeral was attended by over 28 from the amateur radio fraternity, who offer sincere condolences to Jack's only surviving relatives, his brother Joe and family.

From Orange and District Amateur Radio Club Newsletter Feb '93

Victor William Bayliss VK2BVW

Bill VK2BVW died at Kiama on 18 January 1993, aged 78. He became well known to virtually every amateur in the region up to the time he moved from Mt Panorama to the coast in 1987. Apart from being Controller of Mitchell Division SES for many years, he was also a generous benefactor to many amateurs starting in the hobby, and a real gentleman.

Bill saw service in the Pacific area in WWII, reaching the rank of Captain in the Australian Army. Farming was generally regarded as his main pursuit for many years, but Bill had very wide interests as well. He was for many years president of both Bathurst Legacy and Bathurst Eisteddfod Society and was active in the Boy Scout Movement.

In 1931 he and his brother Ray instigated motor bike racing at the Vale Circuit, Bathurst. This eventually led to the opening of the now world-famous Mount Panorama Motor Racing track, a most important venue for car racing as well as a vital part of the local economy. His property was halfway down Conrod Straight!

For his services to the community Bill was awarded the British Empire Medal in 1988.

Bill always had time for a chat with any amateur from the area, and kept up regular skeds with Tom VK2NN and others.

Sadly, his widow Collie is extremely ill, and our sincere sympathy goes to son Greg of Bathurst and the other members of Bill's family. He will be missed by all of us, but not forgotten.

From Orange and District Amateur Radio Club Newsletter Feb '93

Geoffrey Richard Hughes VK3AUX

Almost 50 years ago (1945) I first met Geoffrey Richard Hughes who was then a part time dance instructor at the local ballroom dance studio, as well as being a student at the Pharmacy College where he obtained his degree in 1945.

He was also studying for his amateur radio licence and teaching me the finer points of crystal set building. All the parts for this "magically" appeared from his well stocked "junk box". In 1946 he was issued with the callsign VK3AUX and in the same year married his XYL Joan. Geoff was practising his profession at a pharmacy in Toorak Road, South Yarra.

He subsequently took over that business and lived in the dwelling over the shop for most of his working life. It was here, in between professional duties and raising a family of three energetic boys, that he experimented with television using a homebrew camera, pulse generator etc.

Video was put to air on 576 MHz and action shots were obtained by aiming the camera out of the window on to busy Toorak Road.

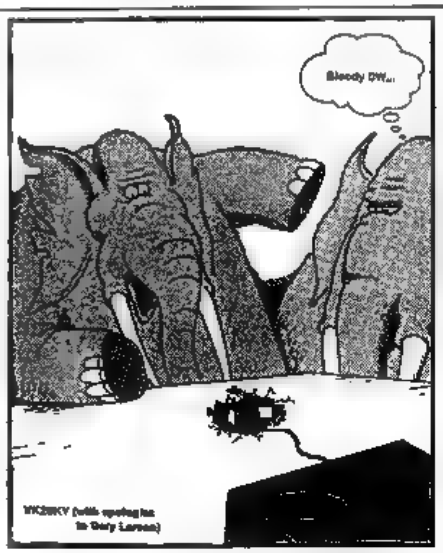
On his retirement from business he took up an interest in geology and went on many field trips.

Amateur radio interests now included experiments on 1296 MHz and 10 GHz. In 1980, he and VK3YFU established a 10 GHz record (60 km).

In recent years besides being an active amateur, he shared his love of classical music (on a voluntary basis) with patients at a hospital for the blind.

So, Au Revoir dear friend and mentor. Your memory shall remain with all of us.

James A Horwood
VK3ZHW



Why you never hear elephants on HF.

Over to You — Members' Opinions

All letters from members will be considered for publication, but must be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

TVI and Dutch Spelling

The article by Richard Cortis VK2XRC on television interference reminded me of a case from a source other than amateur radio. The interference appears only on Channel 9 and originates from an Eveready Rechargeable Emergency Lamp RE60. It causes two ragged-edge parallel bars to appear on the screen and roll slowly upwards, disappearing at the top then reappearing at the bottom. I understand the company has been contacted by DOTAC, but its response could not be likened to a speeding bullet! At present, removal of the offending device from the AC supply is the only way to clear the problem which, on a "good" night, can make its presence felt for a radius of 200-300m, frustrating quite a few ardent TV viewers.

As an old former Tasmanian I would like to make a correction to the details regarding the "Special Event Station VI7AJT", by Frank VK7ZMF, AR Nov '92 p31.

The name was ABEL JANSZOON TASMAN (not JANSEN) and the ship was the ZEEHAEN. Abel Janszoon Tasman (1603-c1659) was born at Lutjegast, a village in Friesland, northern Holland, and his expedition comprised the two ships "Heemskirk" and "Zeehaen" (with an E). However Zeehan (without an E) became the place name for the Tasmanian west-coast town as we know it today.

Ted Wraight VK3ALT
8 Gregory Court
Pakenham 3810

(I plead guilty, Ted. The original p31 item spelled the name Janszoon, but I changed it to the usual English form which had been submitted for p36 ... VK3ABP, Ed.)

Iambic Keyers

Is there someone reading this who may be able to give me the correct answer? As I am getting aged, bad tempered, forgetful and arthritic and still looking for an easy way to retain my CW skills, I sold my old just worn-out Vibroflex (which I purchased in 1928, but actually did not receive until about the outbreak of WWII) and purchased a Vibroflex Iambic Keyer. I did actually make a small profit on the deal.

Whilst I realize that one can drive the thing anyway one likes, there must be a correct way, and only one way that will produce good readable copy.

Which is the DOT paddle and which is the DASH paddle?

I do not wish to go through the same trauma as I did in 1939 when I used my Bug in Sigs, and thought that my copy was beaut, but got very tired of hearing "ditdit dahdah ditdit pse use other foot"! It took me about a year to forget all the bad habits I had picked up, to learn to use it and to make it turn out consistently good readable copy at commercial speed.

Is there any writing available on Iambic Keying? Hope that you will be able to get me some help.

George Trotter
VK2AVY AX2E23
568 Buckhorn Street
Lavington NSW 2641

Homebrew Hi Tech, Cost not Problem

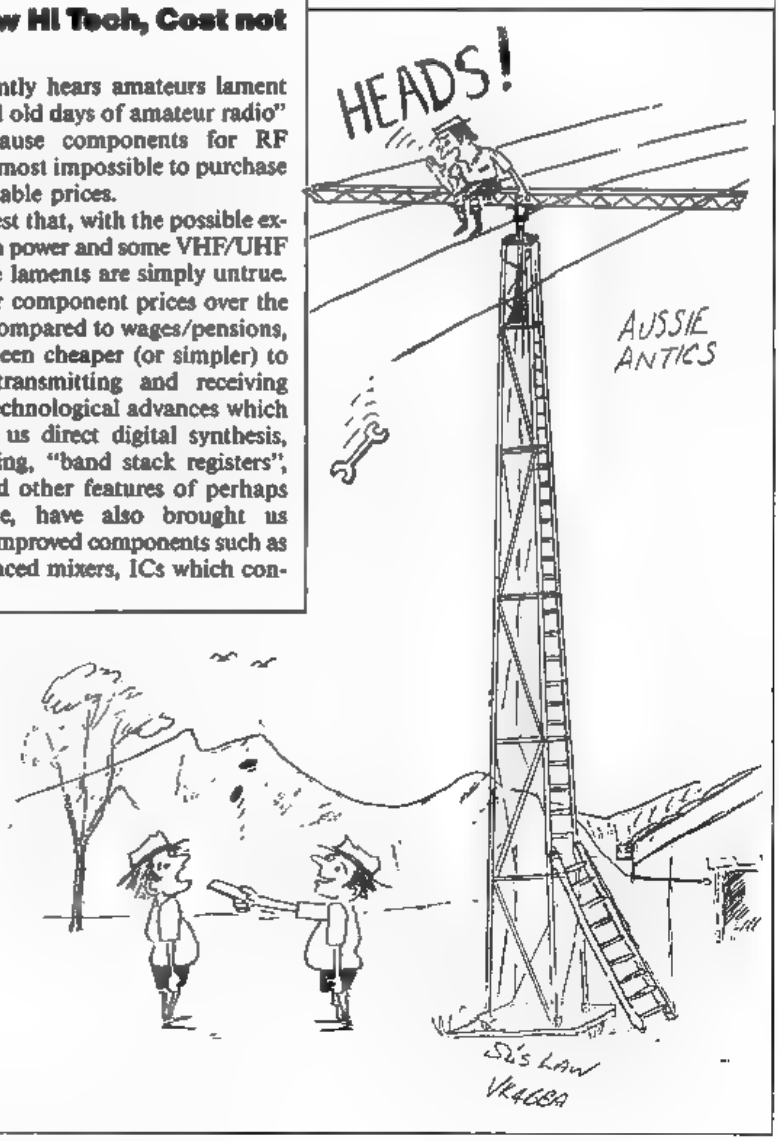
One frequently hears amateurs lament that the "good old days of amateur radio" are over because components for RF projects are almost impossible to purchase new at reasonable prices.

May I suggest that, with the possible exception of high power and some VHF/UHF projects, these laments are simply untrue. If we consider component prices over the last 20 years compared to wages/pensions, never has it been cheaper (or simpler) to build basic transmitting and receiving equipment. Technological advances which have brought us direct digital synthesis, passband tuning, "band stack registers", memories, and other features of perhaps dubious value, have also brought us homebrewers improved components such as low cost balanced mixers, ICs which contain almost a whole receiver on the one chip, and ceramic resonators which permit the experimenter to construct high quality, frequency-agile transmitters without the cost of crystals, and the complications of a VFO (see AR 7/91, p21).

Information and components are widely available from VHF or QRP groups, although it must be admitted that often much of this information is confined to specialist club publications, and is rarely seen in the general amateur radio media.

As one who has experimented with both valve and solid-state communications equipment, I find that while valves may be cheaper if you have all the components at hand, and seem to be better for higher power HF equipment. I do not miss the many hours spent drilling holes and working with a chassis prior to my move to solid state equipment.

Peter Parker VK6BWI
14 Marquis Street
Bentley WA 6102



HF Predictions

Evan Jarman VK3ANI

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for the five bands from 14 to 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1 μV (dBU) at the MUF; the fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1 μV in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50 μV at the receiver's input and the S-meter scale is 6 dB per S-point.

μV in 50 Ohms	S-points	dB(μV)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4
0.78	S3	2
0.39	S2	-8
0.20	S1	-14

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

VK EAST The major part of NSW and Queensland.

VK SOUTH Southern-NSW, VK3, VK5 and VK7.

VK WEST The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used for this month's predictions is 74.4. Next month the predicted value is 73.1.

ar

VK EAST: Africa

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	13.2	8	9.6	8	2	-7	-22	...
2	14.2	6	10.9	6	5	0	-11	-25
3	13.7	0	10.5	1	2	-2	-13	-26
4	16.5	2	12.3	-2	3	1	-4	-14
5	21.8	5	16.8	-7	4	5	3	-2
6	23.7	5	17.1	-9	3	5	4	0
7	24.0	5	17.7	-9	3	6	4	0
8	25.8	6	17.5	-8	5	7	5	0
9	22.3	7	17.4	-2	7	7	4	-2
10	20.3	8	16.1	3	8	7	2	-6
11	18.2	9	14.4	7	9	5	-2	-12
12	16.3	11	12.8	11	9	3	-7	-21
13	15.0	14	11.8	14	9	0	-13	-28
14	14.0	19	11.0	19	9	-2	-19	-38
15	13.2	25	10.4	22	8	-6	-25	...
16	12.7	27	9.9	22	6	-9	-30	...
17	12.1	29	9.4	21	4	-13	-36	...
18	11.5	30	8.9	20	0	-17	...	...
19	11.0	31	8.3	18	-2	-22	...	...
20	11.7	30	8.1	20	1	-16	...	...
21	11.2	29	7.7	17	-2	-21	...	...
22	10.7	21	7.5	12	-5	-23	...	...
23	10.4	15	7.4	8	-7	-24	...	...
24	11.2	9	8.1	7	-3	-17	-37	...

VK EAST:Europe L/P

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	13.2	2	8.8	4	2	-3	-15	-28
2	12.9	5	8.8	6	3	-4	-17	-32
3	12.8	9	8.8	9	3	-5	-19	-35
4	12.2	12	8.5	11	3	-7	-23	...
5	11.3	16	8.0	12	0	-11	-32	...
6	11.7	24	8.4	17	3	-12	-32	...
7	13.9	24	10.1	23	11	0	-16	-35
8	17.7	21	12.9	28	20	13	1	-11
9	16.6	19	12.7	20	17	11	1	-10
10	15.6	12	11.9	11	11	6	-1	-13
11	15.8	5	12.5	3	5	2	-6	-16
12	14.7	-2	11.6	-3	1	-1	-8	-18
13	13.9	-8	10.9	-7	-1	-3	-9	-19
14	13.3	-13	10.4	-10	-2	-3	-9	-19
15	12.7	-18	9.8	-10	-3	-4	-10	-19
16	12.1	-21	9.3	-10	-3	-4	-10	-20
17	11.5	-30	8.7	-13	-6	-8	-13	-25
18	12.2	-21	9.2	-10	-3	-4	-10	-19
19	14.6	-12	11.5	-13	-3	-3	-7	-14
20	18.6	-2	14.1	-16	-3	0	-2	-7
21	18.6	0	12.6	-13	-1	1	-1	-7
22	16.1	-1	10.9	-7	0	0	-5	-13
23	14.6	-1	9.9	-2	1	-1	-8	-19
24	13.7	0	9.2	1	2	-2	-12	-24

VK EAST: Sth Pacific

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	32.3	24	27.2	33	36	36	33	29
2	32.8	24	27.4	34	37	36	34	30
3	32.8	24	27.1	35	38	37	34	30
4	32.6	25	26.6	37	39	38	35	31
5	31.9	26	25.8	40	41	39	35	31
6	30.4	27	24.4	46	44	41	36	31
7	28.5	30	22.6	51	46	42	36	29
8	26.4	31	21.0	51	46	41	34	26
9	24.2	32	19.1	50	44	38	31	22
10	22.1	34	17.5	50	42	36	27	17
11	20.9	35	16.6	49	41	34	24	13
12	19.9	36	15.7	48	40	32	21	10
13	18.6	36	14.9	47	38	30	18	6
14	17.8	37	13.9	46	36	27	15	1
15	16.9	38	13.2	45	34	25	11	-2
16	15.7	39	12.1	43	31	20	6	-8
17	14.2	40	10.9	40	27	14	-1	-18
18	14.1	40	10.8	40	27	14	-1	-18
19	17.0	35	12.9	40	32	23	11	-2
20	22.4	30	17.2	39	36	32	24	15
21	26.9	27	21.1	37	37	33	30	24
22	29.1	26	23.3	35	37	35	31	27
23	30.1	25	24.4	34	36	35	32	27
24	31.3	25	25.9	33	36	35	32	28

VK EAST: Asia

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	30.8	13	25.3	10	19	21	19	16
2	30.5	12	24.5	8	18	20	18	15
3	30.9	12	23.7	8	18	20	19	16
4	31.4	13	26.2	9	18	20	20	16
5	32.4	13	26.8	11	20	22	21	18
6	32.7	14	26.6	15	23	24	23	20
7	31.4	15	25.3	21	26	26	23	19
8	29.8	17	25.0	30	31	29	24	19
9	28.3	20	22.5	44	39	34	27	19
10	26.3	21	21.0	44	38	32	24	15
11	24.7	21	19.6	44	37	30	21	11
12	23.9	22	19.0	44	36	29	19	8
13	23.1	22	18.3	43	35	27	17	6
14	22.0	22	17.6	42	33	25	14	2
15	20.5	23	16.1	40	30	21	8	-5
16	19.3	24	15.1	38	27	17	3	-11
17	17.6	24	13.7	35	23	11	-5	-22
18	15.5	26	12.0	30	15	0	-19	...
19	14.8	26	11.4	28	12	-4	-25	...
20	14.0	26	10.8	25	7	-10	-34	...
21	17.7	21	14.0	29	19	9	-5	-22
22	25.8	16	20.0	24	25	23	17	10
23	29.1	14	23.3	18	23	23	20	15
24	29.5	13	24.0	13	20	21	19	15

VK EAST: Mediterranean

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	13.6	2	10.4	3	2	-3	15	-29
2	12.8	-5	9.7	-2	0	-5	-16	-30
3	16.4	-1	12.3	-7	0	0	-5	-14
4	23.2	5	17.8	-15	0	4	4	0
5	29.5	7	23.1	-21	-1	5	8	7
6	31.1	7	25.5	-23	-2	5	9	9
7	30.6	7	24.8	-21	-1	6	9	9
8	29.2	8	23.5	-16	1	7	10	8
9	27.5	9	23.1	-8	6	10	11	8
10	25.6	11	20.3	1	11	13	11	7
11	23.4	13	18.6	11	16	15	11	5
12	21.5	16	17.0	18	19	16	10	1
13	20.4	19	16.2	27	23	18	9	0
14	19.5	22	15.4	32	26	18	8	-3
15	18.6	24	14.8	34	25	17	5	-8
16	17.6	26	13.8	34	24	15	2	12
17	16.7	27	13.0	34	23	12	2	17
18	15.5	28	12.0	32	19	8	-8	-26
19	14.1	29	10.8	29	14	1	-17	-38
20	14.1	29	10.8	29	14	1	-17	-38
21	16.9	26	13.3	33	23	12	-1	-17
22	16.1	23	12.4	27	18	9	-4	-19
23	15.1	17	11.6	18	12	4	-9	-24
24	16.3	12	12.6	12	11	5	-5	-17

VK EAST: USA/Caribbean

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	28.0	8	23.6	-10	5	9	10	8
2	25.6	9	20.3	-1	9	11	10	6
3	23.0	11	18.3	7	13	13	9	3
4	20.7	14	16.4	15	17	13	7	-2
5	19.5	17	15.4	23	20	14	5	-5
6	18.7	21	14.7	29	22	15	4	-9
7	17.8	24	14.2	32	23	14	1	-13
8	16.9	25	13.3	32	22	12	-2	-18
9	16.2	26	12.6	32	20	9	-5	-22
10	14.8	28	11.4	30	16	3	-14	-33
11	12.9	30	9.9	25	8	-7	-28	...
12	12.7	30	9.7	24	8	-8	-30	...
13	15.7	27	12.4	32	19	7	-8	-26
14	16.6	24	12.9	30	20	11	-2	-18
15	14.4	20	11.1	20	11	1	-14	-31
16	15.8	14	12.2	15	11	4	-7	-21
17	14.2	6	10.9	6	4	-2	-13	-28
18	13.9	0	10.7	0	1	-3	-13	-27
19	16.7	0	12.7	-6	1	0	-5	-14
20	22.0	4	17.0	-13	0	4	3	1
21	26.3	6	20.7	-19	-1	4	6	4
22	28.3	6	22.1	-21	-2	5	7	6
23	29.1	7	23.7	-21	-1	5	8	7
24	30.0	7	24.1	17	1	7	9	8

VK SOUTH: Africa

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	14.0	14	9.5	13	6	-4	-19	-37
2	14.4	11	10.9	11	7	0	-12	-27
3	17.3	11	13.6	9	10	6	-2	-12
4	22.8	9	17.1	5	11	11	7	0
5	24.4	7	18.0	0	8	10	7	2
6	24.9	7	18.2	3	7	9	7	2
7	25.0	7	18.0	-4	7	9	7	2
8	24.7	7	17.6	3	7	9	7	2
9	24.0	8	16.9	0	9	10	7	1
10	22.6	9	15.8	4	11	10	5	-1
11	20.7	10	14.4	9	12	9	3	-5
12	18.6	12	12.9	13	12	7	-1	-12
13	16.5	14	11.4	16	11	4	-8	-22
14	14.9	18	10.3	19	10	0	-16	-34
15	13.6	23	9.4	22	8	-6	-25	.
16	12.7	26	8.7	21	4	-11	-34	.
17	12.1	28	8.4	19	1	-16	.	.
18	11.3	29	7.9	17	-3	-23	.	.
19	11.0	30	7.8	16	-6	-26	.	.
20	10.8	30	7.7	15	-7	-28	.	.
21	11.8	29	8.3	19	0	-19	.	.
22	11.4	28	8.0	17	-2	-21	.	.
23	11.0	22	7.9	13	-6	-22	.	.
24	12.0	16	8.7	12	0	-14	-35	.

VK SOUTH: Asia

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	24.5	10	20.0	6	13	13	10	4
2	25.2	10	20.9	4	12	13	11	5
3	25.6	10	21.6	3	12	13	11	6
4	25.7	10	21.5	3	12	14	11	6
5	25.6	11	21.2	5	14	14	12	6
6	25.4	12	20.8	8	15	16	12	7
7	25.0	13	20.2	13	18	17	13	6
8	23.8	15	19.3	20	22	19	12	4
9	22.2	19	17.6	35	29	22	12	1
10	20.3	21	16.1	56	37	18	6	-7
11	18.3	22	14.5	34	23	12	-3	-19
12	16.5	23	13.1	31	17	3	-14	-35
13	15.3	24	12.2	28	12	-2	-23	.
14	14.6	24	11.6	26	8	-8	-31	.
15	13.9	24	11.0	23	4	-14	-39	.
16	13.4	25	10.5	21	0	-19	.	.
17	12.9	25	10.0	18	-3	-24	.	.
18	12.1	25	9.4	14	-10	-33	.	.
19	11.3	26	8.7	9	-18	.	.	.
20	11.7	25	8.9	12	-13	-38	.	.
21	14.0	22	10.6	22	4	-13	-36	.
22	18.1	13	14.0	18	14	6	-5	-19
23	21.8	12	17.1	13	16	13	6	-2
24	23.8	11	19.0	9	15	14	10	3

VK SOUTH: Europe L/[illegible]

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	12.2	-2	8.4	1	0	-8	-20	-35
2	11.9	2	8.3	4	-1	-10	-24	..
3	11.7	6	8.3	6	-1	-11	-28	..
4	11.2	10	8.0	8	-3	-16	-35	..
5	10.5	14	7.6	8	-6	-22	..	..
6	11.0	23	8.0	13	-4	-22	..	..
7	12.8	22	9.5	19	5	-8	-28	..
8	16.0	21	11.9	24	15	6	-8	-23
9	18.4	18	12.7	24	19	12	2	-10
10	16.1	15	11.3	17	12	5	-6	-19
11	14.0	9	10.2	9	6	-1	-12	-26
12	13.7	2	9.4	3	2	-3	-14	-28
13	12.9	-6	9.0	-2	-1	-5	-15	-28
14	12.3	-12	8.5	-5	-2	-6	-15	-27
15	11.6	-18	8.1	-6	-2	-6	-14	-26
16	11.1	-33	7.9	-15	-10	-13	-22	-35
17	10.8	..	7.7	-22	-16	-20	-30	.
18	11.6	-33	8.5	-17	-10	-12	-20	-31
19	13.7	-15	9.3	-13	-4	-4	-8	17
20	17.0	-7	12.6	-18	-5	-2	-4	10
21	17.3	-5	12.1	-16	-4	-2	-4	10
22	15.0	-7	10.4	10	-2	-2	-8	-16
23	13.7	-7	9.4	-5	-1	-4	-11	-22
24	12.7	-6	8.7	-2	-1	-6	-16	-29

VK SOUTH: [illegible]

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	13.9	7	10.7	8	5	-2	-15	-30
2	12.9	-1	9.8	1	0	-6	-18	-33
3	16.7	1	13.2	-4	2	1	-5	-14
4	24.0	6	18.5	12	2	6	5	2
5	27.8	6	23.3	19	0	5	7	6
6	27.7	6	22.9	21	2	4	6	5
7	27.6	6	22.6	21	2	4	6	5
8	27.2	6	22.0	18	0	5	7	5
9	26.0	7	20.8	12	3	7	7	4
10	24.2	8	19.1	-4	7	9	7	3
11	22.1	10	17.4	4	11	10	6	0
12	19.8	12	15.6	12	14	11	3	-6
13	17.6	16	13.9	20	16	9	2	-15
14	16.3	21	12.8	25	16	6	7	23
15	15.2	24	12.0	27	15	3	13	32
16	14.4	26	11.4	26	12	1	19	.
17	13.9	27	10.9	26	11	3	23	.
18	13.4	28	10.4	25	8	7	28	.
19	12.7	28	9.8	23	5	12	35	.
20	12.1	29	9.2	20	1	16	.	.
21	12.8	28	9.7	23	5	11	33	.
22	15.3	24	11.5	27	15	3	13	32
23	16.5	21	12.7	25	18	10	2	17
24	17.0	16	13.1	19	15	8	2	15

VK SOUTH: Sth Pacific

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.7	17	12.8	19	12	3	-11	27
2	15.9	17	12.9	19	13	4	-10	26
3	16.0	17	13.0	20	13	4	-9	25
4	16.1	18	13.1	21	14	5	-8	24
5	16.1	19	13.0	22	15	5	-8	25
6	16.0	21	12.9	24	15	5	-9	26
7	15.5	23	12.6	26	15	4	-12	31
8	14.8	27	11.9	29	14	1	-18	39
9	14.0	28	11.2	27	11	5	-26	.
10	13.2	29	10.5	24	6	12	36	.
11	12.5	29	9.8	22	1	-18	.	.
12	12.0	28	8.8	16	-8	31	.	.
13	11.3	26	8.0	9	-19	.	.	.
14	10.6	26	7.6	3	-28	.	.	.
15	10.0	27	7.1	-2	-36	.	.	.
16	9.4	27	6.7	-9	.	.	.	.
17	9.1	27	6.6	-12	.	.	.	.
18	9.0	27	6.6	-13	.	.	.	.
19	9.9	27	7.4	-3	-38	.	.	.
20	11.4	23	8.0	8	-18	.	.	.
21	13.1	19	10.3	16	0	17	.	.
22	14.2	17	11.5	18	7	-5	-24	.
23	15.4	18	12.5	20	11	1	-14	-32
24	15.7	18	12.7	19	12	3	-11	-28

VK SOUTH: USA/Caribbean

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	28.6	9	21.4	-10	5	10	11	9
2	27.4	10	21.8	-1	10	13	12	9
3	24.9	12	19.8	8	15	15	12	7
4	22.7	15	18.0	17	19	17	11	4
5	21.5	18	17.0	24	22	18	11	1
6	20.7	20	16.4	30	25	19	10	0
7	19.7	23	15.7	34	27	19	8	-4
8	18.5	24	14.5	34	25	17	4	-9
9	17.5	26	13.6	34	24	14	0	14
10	15.6	27	12.1	32	19	8	-8	-26
11	13.4	29	10.3	27	11	-3	-23	.
12	13.0	30	9.9	25	9	-6	-27	.
13	14.9	27	11.7	30	16	3	-14	34
14	14.3	24	11.2	24	12	0	18	-37
15	13.8	18	10.7	17	8	-3	-20	-39
16	13.0	9	10.0	9	3	-7	-22	..
17	12.3	1	9.4	3	0	-9	-23	..
18	13.0	-3	9.8	-1	0	-6	-17	32
19	15.6	-2	12.3	-6	0	-1	-8	-18
20	20.0	2	15.3	-12	0	2	0	-5
21	24.1	4	18.8	-19	-1	3	4	1
22	26.7	5	21.2	-21	-2	4	6	4
23	27.7	6	22.5	-21	-1	4	7	5
24	28.4	7	23.6	-17	0	6	8	7

VK WEST: Africa

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	12.4	20	9.4	16	3	-10	30	.
2	14.0	15	10.7	15	9	0	-15	31
3	16.8	13	13.3	13	12	6	-3	15
4	22.2	12	17.2	10	14	13	8	1
5	25.6	9	19.2	3	12	12	10	4
6	25.7	8	21.5	0	10	11	9	4
7	25.6	7	21.2	-1	9	10	8	3
8	25.5	7	20.9	-1	9	10	8	3
9	25.1	8	20.3	0	9	11	8	3
10	24.0	9	19.2	3	11	11	7	1
11	22.4	10	19.0	9	13	12	6	1
12	20.5	12	16.2	14	15	11	3	-6
13	18.3	15	14.5	19	15	9	-1	-14
14	16.3	19	12.9	23	15	5	-8	-24
15	15.1	24	11.9	27	14	2	-15	-34
16	14.1	26	11.1	26	11	-2	-22	.
17	13.3	28	10.5	25	8	-7	-28	.
18	12.8	29	10.0	24	6	-10	-33	.
19	12.2	30	9.5	22	3	-14	-38	.
20	11.7	31	9.0	20	0	-18	.	.
21	11.1	31	8.5	18	3	-23	.	.
22	11.9	30	9.0	21	1	-17	.	.
23	12.6	30	9.7	24	6	-10	32	.
24	11.8	26	9.1	18	2	-15	-38	.

VK WEST: Asia

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	28.2	13	22.6	14	20	21	18	13
2	28.7	13	23.4	11	19	[illegible]	18	13
3	29.6	13	24.5	9	18	20	18	15
4	29.9	13	23.6	8	18	20	18	15
5	30.4	13	25.3	9	18	20	19	16
6	31.4	14	25.9	11	20	22	21	18
7	31.6	14	25.9	15	22	24	22	19
8	31.0	15	25.2	20	26	26	23	19
9	29.7	17	23.9	28	30	28	24	19
10	28.0	19	23.5	39	35	31	25	18
11	26.3	20	20.9	41	36	30	23	14
12	24.3	20	19.3	41	34	28	19	9
13	22.5	21	17.9	41	32	25	14	2
14	21.6	22	17.1	41	32	23	11	1
15	20.7	22	16.4	40	30	21	8	5
16	19.7	22	15.8	39	28	17	4	-11
17	18.6	23	14.6	37	24	13	2	-18
18	17.6	23	13.8	35	21	9	7	-26
19	16.2	24	12.6	31	16	2	17	39
20	14.5	24	11.2	26	7	-10	-33	..
21	13.8	25	10.7	23	3	-15	..	..
22	17.0	22	13.4	31	18	5	-12	-31
23	22.2	15	17.3	23	22	17	9	0
24	26.5	14	20.9	18	22	21	17	10

VK WEST: Europe L/P

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.7	13	8.1	5	-4	-9	20	-33
2	11.4	-10	8.0	-3	-4	-11	23	-38
3	11.2	-6	8.0	-1	-5	13	27	.
4	10.7	3	7.7	0	-6	16	32	.
5	10.1	1	7.4	1	-8	-21	.	.
6	10.5	5	7.8	4	-7	-21	.	.
7	12.3	10	9.2	8	-1	12	29	.
8	15.2	14	11.3	15	8	0	13	-28
9	18.2	14	13.6	19	14	8	1	-13
10	18.7	15	13.7	18	16	11	2	7
11	14.8	9	11.4	9	6	0	10	-23
12	13.9	2	10.7	2	2	3	-13	-25
13	14.7	2	9.9	-3	0	4	-12	-23
14	13.6	-9	9.1	-7	3	-6	-14	-24
15	12.7	16	8.7	-9	-4	-7	-14	-24
16	12.1	21	8.2	-11	5	7	-14	-24
17	11.5	34	7.9	-18	11	13	-21	-32
18	11.0	.	7.7	-23	16	19	-27	.
19	10.6	.	7.5	27	21	-24	-33	.
20	11.5	38	8.2	-20	13	-15	-23	-34
21	13.5	-18	9.0	-14	-6	-6	-11	-19
22	14.4	14	10.1	-15	-6	-5	-10	-18
23	13.1	-16	9.2	-11	-5	-6	-13	-22
24	12.2	-15	8.5	-8	-4	-8	-16	-28

VK WEST: Mediterranean

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	12.7	14	9.7	12	1	-11	-29	.
2	11.9	4	9.0	5	-3	-14	-32	.
3	15.2	4	12.0	2	3	-2	-12	-25
4	21.7	6	16.7	-2	6	7	3	-3
5	27.1	7	20.5	-9	5	9	9	6
6	27.4	7	22.9	-12	3	8	8	6
7	27.3	6	22.6	-14	2	7	8	5
8	27.2	7	22.3	-13	3	7	8	5
9	26.8	7	21.7	-10	4	8	8	5
10	25.6	8	20.5	-5	7	9	8	4
11	23.9	10	20.2	3	11	12	8	3
12	22.1	12	17.6	12	15	13	8	0
13	20.1	16	16.0	21	19	14	5	5
14	18.3	20	14.5	27	20	12	0	-14
15	17.2	22	13.7	30	20	10	-4	-20
16	16.4	24	13.0	30	18	7	-8	-26
17	15.6	25	12.4	30	16	4	-13	-32
18	14.9	26	11.7	29	14	0	-18	-38
19	14.3	27	11.1	27	11	-3	-23	..
20	13.4	27	10.3	24	7	-9	31	.
21	12.3	28	9.3	20	1	17	.	.
22	12.6	28	9.6	21	3	15	39	.
23	15.1	26	11.9	28	14	1	-17	-37
24	14.5	23	11.2	23	12	0	-17	-36

VK WEST: Sth Pacific

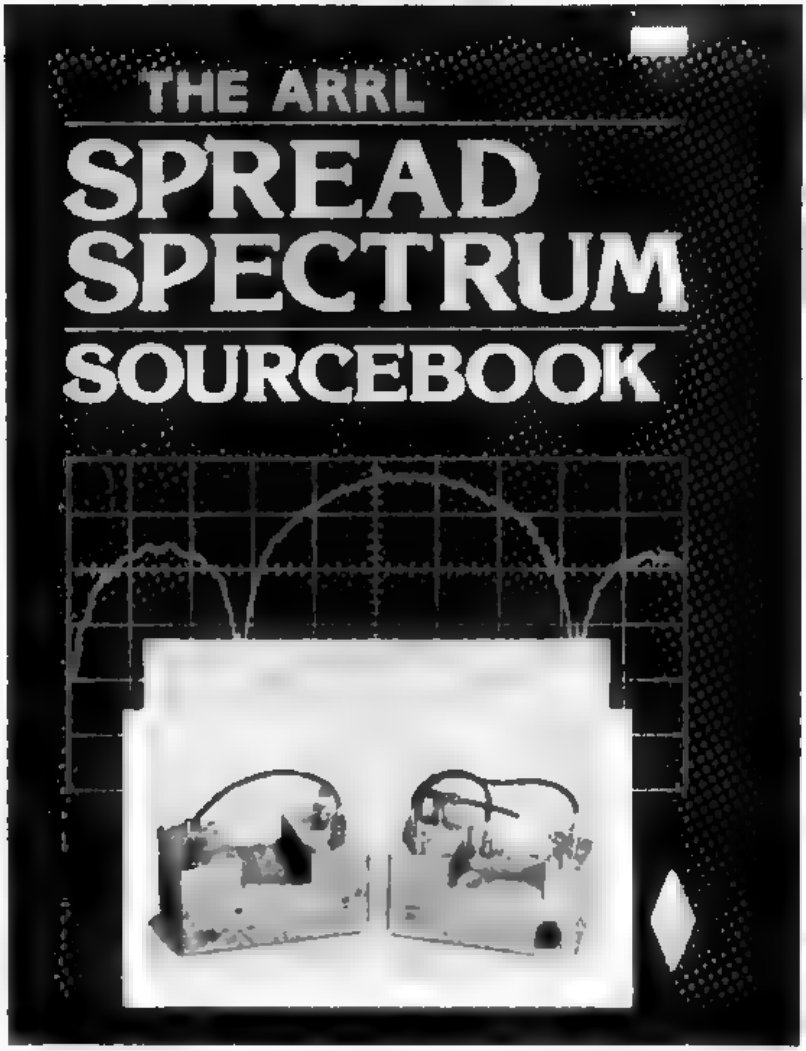
UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	16.4	16	13.3	17	13	6	-5	-20
2	16.6	15	13.4	16	13	7	-4	-17
3	16.6	15	13.5	16	13	6	-4	-17
4	16.7	15	13.5	16	13	7	-3	-16
5	16.9	16	13.7	17	14	8	-3	-15
6	17.0	17	13.8	18	15	9	-2	-15
7	17.0	18	13.7	21	16	9	-2	-15
8	16.9	21	13.7	24	18	10	-1	-16
9	16.5	23	13.4	28	19	10	-3	-19
10	15.9	26	12.8	31	20	9	-6	-24
11	15.2	27	12.2	30	18	5	-11	-30
12	14.5	28	11.6	29	15	1	-17	-38
13	13.9	28	10.6	27	10	-5	-27	.
14	13.4	26	9.5	23	3	-15	.	.
15	12.6	25	8.7	17	-5	-26	.	.
16	11.8	25	8.3	12	-13	-37	.	.
17	11.2	26	7.8	8	-19	.	.	.
18	10.5	26	7.4	3	-27	.	.	.
19	10.2	26	7.2	0	-32	.	.	.
20	10.0	26	7.2	-1	-34	.	.	.
21	10.9	24	8.0	6	-21	.	.	.
22	12.6	18	8.7	13	-5	-24	.	.
23	14.3	16	11.1	16	5	-7	25	.
24	16.0	15	12.4	17	10	1	13	-29

VK WEST: USA/Caribbean

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	27.4	8	22.3	20	0	6	8	7
2	25.3	8	20.1	13	3	8	8	6
3	22.7	9	18.0	5	7	9	8	3
4	20.3	10	16.0	3	10	10	6	1
5	18.9	13	15.0	10	13	11	4	4
6	18.1	16	14.3	17	16	12	3	7
7	17.2	20	13.7	23	19	12	1	11
8	16.5	25	12.9	29	21	12	0	15
9	15.9	27	12.4	31	21	11	3	19
10	14.6	29	11.3	30	18	6	10	29
11	12.9	32	9.9	27	12	3	23	.
12	12.8	32	9.8	27	11	3	24	.
13	15.7	30	12.4	34	22	11	4	21
14	15.6	27	12.3	30	19	9	6	23
15	14.8	22	11.7	23	14	4	10	27
16	14.3	16	11.2	16	11	2	11	27
17	13.9	9	10.8	9	7	0	12	27
18	13.1	1	10.1	3	3	3	14	28
19	12.4	6	9.5	0	1	4	15	28
20	13.0	9	9.9	4	0	3	11	22
21	15.6	5	12.3	10	0	0	4	12
22	20.2	1	15.5	18	2	2	1	3
23	24.2	4	18.9	24	4	2	4	2
24	26.6	6	21.2	24	3	3	6	5

The ARRL Spread Spectrum Sourcebook

Edited by A Kesteloot N4ICK and C L Hutchinson K4CH
Published by ARRL
Reviewed by Evan Jarman VK2ANI



The ARRL Spread Spectrum Sourcebook presents for most amateurs a new concept. Spread spectrum is loosely defined as a signal that has more than 10 times the frequency width of the modulating signal. This ratio of frequencies can be in the order of thousands. As the power of the signal is the same, it means that the power density of the signal falls as the signal is spread. This can mean that signal levels fall below the noise floor of normal receivers and are undetectable while still being received on a spread spectrum receiver. Experiments are being undertaken using spread spectrum techniques as a method of conserving spectrum: more signals with less spectrum. It is the only I have heard of where spectrum can be conserved by using wider signals. Spread spectrum signals effectively just raise the noise floor. The spread spectrum concept is also used as a means of obtaining interference free communication. As an example audio signals have been spread modulated across a television signal and both have been received without any detectable interaction. Another common use is in precise ranging radar for both distance from object and the size of the object.

Spread spectrum techniques have been in use commercially and in the military for many years. In one country a VHF spectrum allocation was made available for amateur use, primarily to give the military a source of interference needed for them to test techniques such as spread spectrum.

Seven years ago the FCC gave permission for US amateurs to operate spread spectrum techniques on frequencies above 420 MHz and in an effort to encourage work in this area this book has been published

The book is written by the ARRL in association with the Amateur Radio Research and Development Corporation (AMRAD) and opens with the perspective of both organisations. It then deals with AMRAD's past efforts in spread spectrum work together with a couple of articles extracted from the pages of QST.

Practical applications and hardware again consists of one section from AMRAD and another from the ARRL. This is the largest section of the book (72 pages). They describe four different systems of spread modulating a signal and give schematic diagrams of some of the systems that have been built. The four systems are frequency hopping, direct sequence (where a rapidly changing binary sequence is used to change the phase of the RF carrier), sweeping carrier and time hopping. Each has advantages and disadvantages in a particular mode so the application generally dictates the system eg sweeping carriers are generally used on radar systems. The diversity of techniques demonstrated could well used as a source of ideas for use in other fields.

The book concludes with two government reports on spread modulation for those who love to theorise as well as a limited bibliography.

There is an enormous amount of information in this book much of which will be new to most radio amateurs. It is solid reading and in total gives a good idea of the amount of work that is required to take an idea and develop it into a viable communications system. Those who are interested in alternative techniques or who thought that there is nothing new under the sun will find in this book a wealth of information and an eye opener. This is not a book for beginners. It does include a lot of mathematics especially in the theory sections and the government reports. The mathematics used are logarithms, summations, sequences and series but stops short of applying calculus. Nothing more complicated than high school.

The Spread Spectrum Sourcebook is a paperback of 384 pages (278mm by 210mm) and is published by The American Radio Relay League.

The review copy came from Stewart Electronic Components.

HAMADS

TRADE ADS

● AMIDON FERROMAGNETIC CORES: For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please .. 14 Boanyo Ave Kiama). Agencies at: Geoff Wood Electronics, Sydney Webb Electronics, Albury: Assoc TV Service, Hobart: Truscotts Electronic World, Melbourne.

● WEATHER FAX programs for IBM XT/ATs *** "RADFAX2" $35-00, is a high resolution shortwave weatherfax, morse and RTTY receiving program. Suitable for CGA, EGA, VGA and Hercules cards (state which). Needs SSB HF radio and RADFAX decoder. *** "SATFAX" $45-00, is a NOAA, Meteor and GMS weather satellite picture receiving program. Needs EGA or VGA & WEATHER FAX PC card, + 137 MHz Receiver. *** "MAXISAT" $75-00 is similar to SATFAX but needs 2 MB of expanded memory (EMS 3.6 or 4.0) and 1024 x 768 SVGA card. All programs are on 5.25" or 3.5" disks (state which) plus documentation, add $3-00 postage. ONLY from M Delahuntly, 42 Villiers St, New Farm QLD 4005. Ph (07) 358 2785.

FOR SALE NSW

● YAESU FT101ZD good cond, good performer, new finals, $560; VK2UJ QTHR (066) 65 3213.

● DECEASED ESTATE. Offers in writing (letter or fax) are invited for the following equipment: YAESU FT-301S HF (80-10m) txcvr (#7 120575); fully solid state, 30W SSB & 10W CW, incl mic & power cable for 13.5V supply; YAESU FP-301 13.5V power supply, suits FT301 (above); YAESU FL-110 HF linear amplifier (#7J030422), solid state, 100W, requires 13.5; YAESU FT-7 HF (80-10m) txcvr (#8H060939), solid state, 20W SSB, incl mobile mounting cradle, mic & power cable for 12V supply; ICOM IC22S 2m FM txcvr (#13624), 22 ch PLL synthesiser, 1/10W output, incl mobile mounting cradle & mic; YAESU FT-212RH 2m FM txcvr (#1M790248), fully synthesised, 18 memories, 5/45W output, incl mobile mounting cradle & mic; MICROWAVE MML-144/25 2m linear amplifier & receiver preamp (#7791278), 25W out (3W in), rx preamp 12dB gain, internal RF VOX circuit, 13.5V required, ICOM IC-202E SSB/CW 2m portable txcvr (#02464), VFO 144.0-144.4MHz, incl carry strap & mic; KEN KP-202 2m FM H/T txcvr; 6 channel, 2W output; ICOM IC2A 2m FM H/T txcvr (#12216464), PLL synthesiser 5kHz steps (thumb-wheel), 0.15/1.5W output, AC charger; STANDARD C146A 2m FM H/T txcvr (#W240341), 5 channel, 2W output, incl leather carry case & telephone-type handset; YAESU FL2100B HF linear amplifier (#7G170092), built-in 240V power supply, 1200W max output. Most of the above are in good order (no mods) and are complete with operating manuals, technical handbooks, circuit diagrams etc. Successful purchaser will be responsible for collection and cartage. All offers to buy received by 31 March 1993 will be considered. Contact Bruce Carroll VK2DEC on (063) 62 8703 or fax on (063) 62 7950, or PO Box 128, Orange 2800.

● PERSON who bought TM401A at Gosford can have forgotten manual. Send SASE (large) with serial number. Swivel chair for shack. $20 ono. Yaesu 207 handheld with accessories, $300 ono. VK2YXM QTHR.

● MOBILE WHIPS, two sets 10-80m $100 per set; 20m helical $50; RTTY equip, Infotech keyboard and modem with cables and manual $400; GFS modem and 2 teleprinter $125 the lot. All good order. VK2BDT Goulburn QTHR (048) 21 5036.

● 1992 AMATEUR CALLBOOKS International and North American listing, both volumes $75 posted. Steve VK2PS QTHR (02) 654 1809.

FOR SALE VIC

● MASPRO NEW YAGI 10-el 144MHz $125; 14-el 430MHz $100; Araki power divider 144MHz $110; 430MHz $100; Kingrotor rotator 100m cables $300; 10DFB cable & N connectors 30m $300; Decibel 144MHz cavity filter $350; Yaesu FT747GX, Ser No 3L020338, EC, MH-1B6 mic, sp/mic, FNB-3 Nicad Pack, YH-2 for hands-free, carry case, technical manual $395; Victor (03) 480 4137.

● ICOM IC-24AT dual band txcvr s/n 01659, battery packs BP83/90, charger BC72, a/n 1455, AC adaptor K565-V, TOKYO ANTENNA coupler HC202. Power SWR meter, a/n 60466, also ANTENNA MOUNTING and CO-AX. Total price $625. VK3DLJ, QTHR (03) 562 1771.

● HF LINEAR amplifiers [illegible] SOLD [illegible] VK3FDX (03) 457 7292.

● YAESU FL2100B linear amp EC $550; YAESU FT101E with matching speaker VGC $425; DAIWA CN-510 compact 20 & 200 W Pwr/SWR meter $80; Ron VK3OM QTHR (059) 44 3019.

● 70CM PA MMC 432/50 $200; OSKER BLOCK SWR $40; Ted VK3TG (052) 59 3225.

FOR SALE QLD

● ICOM IC-745 HF transceiver/general coverage receiver with built-in AC power supply, VGC, change in location prompts sale. Maintenance manual included, $750. VK4AGB QTHR (07) 286 5921 or (07) 821 1825.

● LABTECH CRO mod Q0155 20meg dual trace with probes, manual, original box, as new, $550 ono. Switchbox X-3575, Dick Smith, 3XDB25 pin outlets 3XDB25 input. As new. $30. VK4ECS, QTHR ph (071) 25 3415.

● YAESU FRG7700 with tuner, $480; NATIONAL DR49 RX, $220; SCANNERS Realistic Pro-2003 $180; Bearcat 350, best offer; Ron VK4BL, QTHR, (070) 55 0230.

FOR SALE SA

● MARCONI sig gen TF 801B/1, manual, perfect working order, $100; D Campbell VK5WE QTHR.

● MFJ 1278 $420, Yaesu FT767GX 1.8-432Mz txcvr, $2700, Yaesu FT650 HF-6M 100W all mode $1700 Yaesu 227R 2m FM txcvr $160; Kenwood PS-30 20amp power supply $250; ELETE LINE 200W HF amp 80-10m $160. MHW7-10 $40. Gary VK5DX (08) 370 9196.

FOR SALE WA

● KENWOOD TS-440S with ATU, VK88SN SSB narrow filter and VK88C CW narrow filter $1790. EC, perfect working order. Selling to upgrade. S/n 9110304 Bob VK6KI QTHR (099) 64 2246 A/H.

FOR SALE TAS

● YAESU ext VFO FV-101B and speaker, landline unit SP101, both EC, $90 ea. Frank VK7LO, QTHR. Ph (004) 33 3231.

● KENWOOD TS520S, EC, new finals fitted, spare driver inc MC50 desk mic, $550. Shure 404C hand mic $60 VK7AN (003) 27 1171 (also) MFJ active antenna, GC, $85.

WANTED NSW

● MILITARY RADIOS type AR-17, 108, 109, 208, 11, 19, 22, B-40, R1155, T1154, Hallicrafters S-27. Also wanted CIRCUIT DIAGRAMS and/or MANUALS for the above sets and for B-41 rcvr, 62 set, University super tracer — AST, ACE radio wideband oscilloscope, AWA gated amplifier type A55765 and AEI HV power supply type R1103A. Photocopies OK. Phone John Farmer BH/AH (02) 888 9411.

● EARLY MORSE KEYS or assoc gear. MARCONI spark coil or TX equipt from Spark era; Ian VK2WR (02) 634 7210 QTHR.

● ANTENNA ROTATOR for 10m beam; VK2CPK (02) 605 4790.

WANTED VIC

● AWA TYPE S AC power pack as used with AT5/AR8, to complete Victorian science museum existing AT5/AR8. If you can help, please contact Allan Doble VK3AMD QTHR (03) 570 4610.

● FC-107 ATU, grey-blue front, must be in GC. Pay up to $250. Ph (03) 547 0910. Thomas.

● SMALL ROTATOR including control box, suitable 144MHz beam. George VK3GI, QTHR (054) 27 2576.

● KYORITSU VTVM model PV200 circuit diagram, details etc, all costs reimbursed. Ken VK3J11 QTHR (03) 580 5347.

WANTED QLD

● CIRCUIT DIAGRAM to suit "Lunar" 2m linear amp, model 2M10-150P or info regarding same. Tel (071) 22 1368 AH, VK4ZGF QTHR.

● WERNER WULF 10/15 beam older type with single-action locking element boom clamps, broken beam for parts ok. John VK4TL (070) 96 8328.

● MEDIUM DUTY rotator, GC, Keith. VK4MAR QTHR (079) 28 1067.

WANTED SA

● MINI-PRODUCTS ANTENNA HQ1 or C-4, VGC with manual. Bill VK5NWL QTHR (08) 255 6976.

MISCELLANEOUS

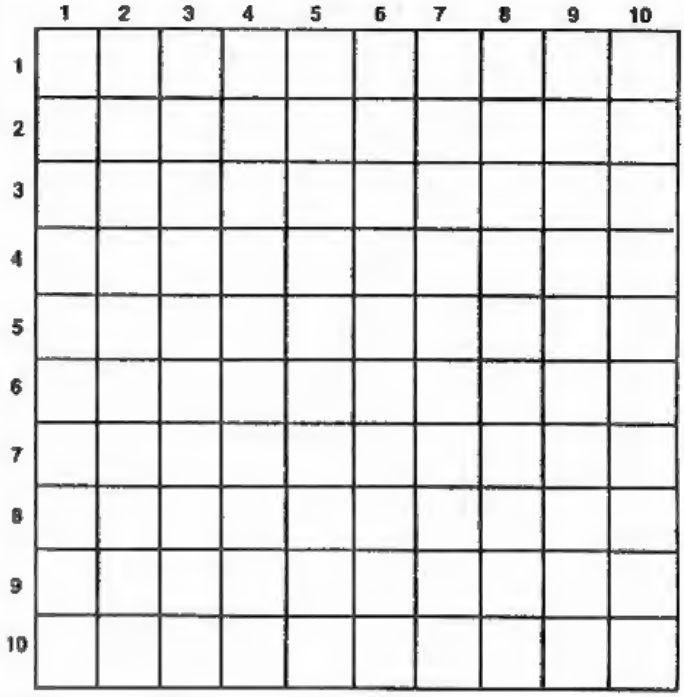
● PLEASE SEND your donation of QSL cards, old or new, to the Hon Curator of WIA QSL Collection, 4 Sunrise Hill Road, Montrose Vic 3765, Tel (03) 728 5350. Let us save something for the future.

● 1992 URUNGA RADIO CONVENTION — Easter 10-11 April, Australia's leading foxhunting events. Climate exceptional, 21-24C, trading tables, competitions, quizzes, free tea, coffee, TV. Children welcome. No stairs, lounge, hall, amenities under one roof. VK2ADA VK2DGT VK2DMS

ar

Morseword 72

Solution on page 56



Across
1 Jeans material
2 Position in the army
3 Gippsland City
4 Smoke in anger?
5 Depressed
6 Crimp
7 Footwear
8 Mouths
9 From in Scottish
10 Conceal

Down
1 Chop finely
2 Attack
3 Pelt
4 Sconce
5 Globe
6 Ship's record
7 US state
8 Young Arnold
9 Large feline
10 Mothers

Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details: eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.
*Eight lines per issue free to all WIA members, ninth line for name and address. Commercial rates apply for non—members. Please enclose a mailing label from this magazine with your Hamad.
*Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.
*Copy typed or in block letters to PO Box 300, Caulfield South, Vic 3162, by the deadline as indicated on page 1 of each issue.
*QTHR means address is correct as set out in the WIA current Call Book.

*WIA policy recommends that Hamads include the serial number of all equipment offered for sale.
*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.
Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re—sold for merchandising purposes.
Conditions for commercial advertising are as follows: $25.00 for four lines, plus $2.25 per line (or part thereof) Minimum charge — $25.00 pre—payable.

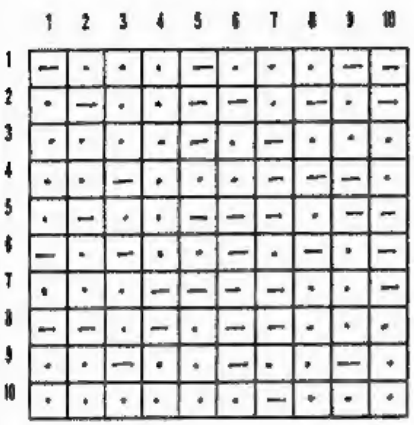
State: .....

Not for publication: ❑ Miscellaneous ❑ For Sale ❑ Wanted

Name:..... Call Sign: ..... Address: .....

Solution to Morseword No 72

Page 55



Solution to Morseword No 72
Across: 1 Denim, 2 Rank, 3 Sale, 4 Fume, 5 Low, 6 Kink, 7 Sox, 8 Maws, 9 Frae, 10 Hide.
Down: 1 Dice, 2 Raid, 3 Skin, 4 Head, 5 Orb, 6 Log, 7 Iowa, 8 Arnie, 9 Tiger, 10 Mums.

TYPESETTING AND PRINTING: Industrial Printing, 122 Dover Street, Richmond, 3121, Telephone: 428 2958

MAIL DISTRIBUTION: R L Polk & Co Pty Ltd, 96 Herbert St, Northcote, Vic. 3070, Tel: (03) 482 2255

ADVERTISERS INDEX

HOW TO JOIN THE WIA

Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 300
Caulfield South, Vic 3162

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms:.....

.....

Call Sign (if applicable):.....

Address:.....

.....

.....

State and Postcode:.....

VK QSL Bureaux

The official list of VK QSL Bureaux. All are inwards and Outwards unless otherwise stated.

VK1	GPO Box 600 Canberra ACT 2601
VK2	PO Box 73 Teralba NSW 2284
VK3	40G Victory Boulevard, Ashburton VIC 3147
VK4	GPO Box 638 Brisbane Qld 4001
VK5	PO Box 10092 Gouger Street Adelaide SA 5000
VK6	GPO Box F319 Perth WA 6001
VK7	GPO Box 371D Hobart Tas 7001
VK8	C/o H G Andersson VK8HA Box 619 Humpty Doo NT 0836
VK9/VK0	C/o Neil Penfold VK6NE 2 Moss Court Kingsley WA 6026

WIA Divisional Bookshops

The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division)

	Ref	Price to Members
ANTENNAS		
Ant. Compendium Vol 2 Software 5.25" IBM Disk	BX293	$20.00
Antenna Collection — RSGB	BX381	$44.00
Antenna Compendium Vol 1 — ARRL	BX163	$22.00
Antenna Compendium Vol 2 — ARRL	BX292	$24.00
Antenna Impedance Matching — ARRL	BX257	$30.00
Antenna Note Book W1FB — ARRL	BX179	$20.00
Antenna Pattern Worksheets Pkt of 10	BX302	$3.00
Antennas 2nd ed John Kraus — 1988	BX259	$104.00
Easy Up Antennas	MFJ36	$39.25
G-QRP Antenna Handbook	BX452	$22.50
Novice Antenna Notebook — DeMaw W1FB — ARRL	BX182	$18.00
Physical Design of Yagi — 3.5" IBM Disk	BX388B	$20.00
Physical Design of Yagi — 3.5" Mac Disk Excel Format	BX388C	$20.00
Physical Design of Yagi 5.25" IBM Disk	BX388A	$20.00
Physical Design of Yagi Antennas — The Book	BX388	$40.00
Practical Antenna Handbook — Tab	BX026	$48.00
Practical Wire Antennas — RSGB	BX298	$28.00
Reflections — Software 5 inch disk	BX358	$20.00
Reflections Transmission Lines and Antennas — 5.25" IBM	BX348A	$20.00
Reflections Transmission Lines and Antennas — ARRL	BX348	$40.00
Simple Low Cost Wire Antennas	BX218	$25.60
Smith Chart Expanded Scale Pk of 10	BX903	$8.00
Smith Charts S/Scale 1 SET co-ord Imp/Admir Pack of 10	BX901	$5.00
Smith Charts Stand Scale 1 SET Co-ot. Pk of 10	BX900	$5.00
The Antenna Handbook — ARRL 1991 edition	BX370	$40.00
The Easy Wire Antenna Handbook	BX002	$20.00
Transmission Line Transformers — ARRL	BX329	$40.00
Vertical Antenna Handbook — Lee — 1990	BX284	$22.00
Yagi Antenna Design — ARRL	BX164	$30.00
ATV		
An Introduction Amateur TV	BX369	$20.00
The ATV Compendium — BATC	BX270	$17.50
The Best of CQ-TV volume 2	BX273	$17.50
CALL BOOKS		
Radio Call Book International 1993	BX339	$69.90
Radio Call Book North America 1993	BX338	$73.90
FICTION		
CQ Ghost Ship — ARRL	BX204	$10.50
Death Valley QTH — ARRL	BX205	$10.50
DX Brings Danger — ARRL	BX206	$10.50
Grand Canyon QSO — ARRL	BX207	$10.50
Murder By QRM — ARRL	BX208	$10.50
SOS At Midnight — ARRL	BX209	$10.50
HANDBOOKS		
ARRL Handbook — 1993	BX369	$52.80
Electronics Data Book — ARRL	BX201	$24.00
Mobile Radio Handbook	MFJ33	$24.95
Motorola RF Device Data — 2 Volumes	BX047	$35.50
Radio Communication Handbook — RSGB	BX266	$58.00
Radio Theory For Amateur Operators — Swainston — 1991	BX267	$48.00
Space Radio Handbook — GM4IHJ — RSGB	BX439	$55.00
World Radio TV Handbook	BX450	$48.00
HISTORY		
200 Meters and Down 1936 — ARRL	BX196	$8.00
60 Years of the ARRL — 1981	BX196	$8.00
Big Ear — Autobiography Of John Kraus W8JK — 1976	BX263	$12.95
Bright Sparks of Radio — RSGB	BX264	$44.00
Dawn of Amateur Radio	BX265	$58.00
Golden Classics of Yesterday — Ingram	MFJ30	$21.50
Spark to Space — ARRL 75th Anniversary	BX310	$25.00
INTERFERENCE		
Interference Handbook — Nelson — 1989	BX181	$25.80
Radio Frequency Interference — ARRL — 1992 Edition	BX186	$30.00
MISCELLANEOUS		
Amidon Ferrite Complete Data Book	BX044	$19.50
Design Note Book W1FB — ARRL	BX357	$28.00
Ferrite Confidential Frequency Listing	BX387	$42.00
Ferromagnetic Core Design & Application Handbook	BX135	$77.00
First Steps in Radio — Doug DeMaw W1FB	BX395	$12.00
G-QRP Circuit Handbook — G Dobbs — RSGB	BX441	$31.00
Ham Radio Communications Circuit Files	MFJ37	$24.95
Help For New Hams DeMaw — ARRL	BX308	$28.00
Hints and Kinks 13th edition — 1992 — ARRL	BX330	$18.00
National Educational Workshop 1991 — ARRL	BX384	$24.00
Novice Notes, The Book — QST — ARRL	BX296	$12.00
QRP Classics — ARRL — QST	BX323	$24.00
QRP Note Book — DeMaw — ARRL	BX078	$20.00
Radio Astronomy 2nd edition — John D Kraus — 1986	BX282	$79.90
Radio Auroras — RSGB	BX381	$30.00
Radio Buyers Source Book — ARRL	BX377	$30.00
Shortwave Receivers Past and Present	BX253	$22.00
Solid State Design — DeMaw — ARRL	BX171	$24.00
Vibroplex Collectors Guide	BX025	$35.00
MORSE CODE		
Advanced Morse Tutor — 3.5" Disk	BX328A	$40.00
Advanced Morse Tutor — 5.25" Disk	BX328	$40.00
Morse Code — The Essential Language	BX223	$10.00
Morse Code for Radio Amateurs — RSGB	BX451	$18.00
Morse Code Tapes Set 1: 5-10 WPM — ARRL	BX331	$18.50
Morse Code Tapes Set 2: 10-15 WPM — ARRL	BX332	$18.50
Morse Code Tapes Set 3: 15-22 WPM — ARRL	BX333	$18.50
Morse Code Tapes Set 4: 13-14 WPM — ARRL	BX334	$18.50
Morse Tutor 3.5" IBM Disk	BX187A	$20.00
Morse Tutor 5.25" IBM Disk	BX187	$20.00
OPERATING		
Amateur Radio Awards Book — RSGB	BX297	$30.00
Amateur Techniques — G3VA — RSGB	BX383	$36.00
DXCC Companion — How to Work Your First 100	BX245	$12.00
DXCC Country Listing — ARRL	BX386	$5.00
FCC Rule Book — A Guide to the FCC Regulations	BX379	$18.00
Locator Map of Europe — RSGB	BX396	$8.00
Log Book — ARRL — 9" x 11" Wire Bound	BX232	$7.00
Low Band DXing — John Devoldere	BX196	$20.00
Operating Manual — ARRL — 4th Edition	BX192	$36.00
Operating Manual — RSGB	BX359	$31.00
Passport to World Band Radio	BX346	$34.00
Prefix Map of North America	BX235	$8.00
Prefix Map of the World — RSGB (laminated)	BX397	$20.00
RTTY Today — a Guide to Amateur Radioteletype	BX003	$18.00
Short Wave Propagation Handbook	BX256	$18.00
The Complete DXer — W9KNI	BX194	$20.00
Transmitter Hunting	BX222	$43.00
World Grid Locator Atlas — (Maidenhead Locator) — ARRL	BX197	$10.00
PACKET RADIO		
AX.25 Link Layer Protocol — ARRL	BX178	$18.00
Gateway to Packet Radio 2nd edition — ARRL	BX189	$24.00
Packet Computer Networking Conference 1-4 1982/5	BX186	$36.00
Packet Computer Networking Conference No 10 1991 — ARRL	BX375	$25.00
Packet Computer Networking Conference No 5 1986 — ARRL	BX187	$20.00
Packet Computer Networking Conference No 6 1987 — ARRL	BX188	$20.00
Packet Computer Networking Conference No 7 1988 — ARRL	BX184	$25.00
Packet Computer Networking Conference No 8 1989 — ARRL	BX295	$20.00
Packet Radio Made Easy — Rogers	MFJ32	$20.50
Packet Radio Primer — G8UYZ — RSGB	BX440	$32.00
Packet Users Notebook — Rogers	BX285	$18.50
SATELLITES		
Oscar Satellite Review — Ingram — 1986	MFJ31	$17.00
Satellite AMSAT 5th Space Symposium — ARRL	BX152	$17.50
Satellite AMSAT 6th Space Symposium — ARRL	BX189	$17.50
Satellite AMSAT 9th Space Symposium — ARRL	BX453	$24.00
Satellite Anthology — 1992 Edition — ARRL	BX180	$20.00
Satellite Experimenters Handbook	BX177	$40.00
Space Almanac — ARRL	BX299	$50.00
Weather Satellite Handbook — ARRL	BX324	$40.00
Weather Satellite Handbook Software 5.25" IBM Disk	BX326	$20.00
VHF/UHF/MICROWAVE		
All About VHF Amateur Radio — Orr	BX216	$17.30
International VHF FM Guide — G3UHK — RSGB	BX399	$14.00
Microwave Handbook Vol 1 — RSGB	BX318	$38.00
Microwave Handbook Vol 2 — RSGB	BX437	$57.00
Microwave Handbook Vol 3 — RSGB	BX447	$57.00
Microwave Update Conference 1987 — ARRL	BX174	$17.50
Microwave Update Conference 1988 — ARRL	BX183	$17.50
Microwave Update Conference 1989 — ARRL	BX321	$24.00
Microwave Update Conference 1991 — ARRL	BX448	$24.00
Mid Atlantic VHF Con. October 1987 — ARRL	BX175	$18.50
Spread Spectrum Source Book — ARRL	BX365	$40.00
UHF Compendium Part 1 & 2 Vol 1	BX250	$75.00
UHF Compendium Part 3 & 4 Vol 2	BX251	$75.00
UHF Compendium Part 5 German only	BX254	$62.50
UHF/Microwave Experimenters Manual — ARRL	BX325	$40.00
UHF/Microwave Experimenters Software — ARRL	BX327	$20.00
VHF 21st Central States Con. 1987 — ARRL	BX172	$18.50
VHF 23rd Central States Con. 1989 — ARRL	BX268	$18.50
VHF 24th Central States Con. 1990 — ARRL	BX322	$25.00
VHF 25th Central States Conference 1991 — ARRL	BX436	$25.00
VHF 26th Central States Conference 1992 — ARRL	BX449	$25.00
VHF West Coast Conference 1992	BX444	$25.00
VHF/UHF 15th Eastern Conference — ARRL	BX445	$25.00
VHF/UHF Manual — RSGB	BX287	$48.00
WIA MEMBERS SUNDRIES		
Log Book Covers		$16.00
WIA Badge — Diamond		$4.00
WIA Badge — Diamond With Call Sign Space		$4.00
WIA Badge — Traditional Blue		$4.00
WIA Badge — Traditional Red		$4.00
WIA Car Window Stickers		$0.50
WIA Tape — Sounds of Amateur Radio		$7.00
WIA PUBLICATIONS		
Australian Radio Amateur Call Book — 1993		$11.00
Band Plans Booklet		$2.80
WIA Log Book — Horizontal or Vertical Format		$5.00
WIA Novice Study Guide		$1.50

Not all of the above items are available from all Divisions (and none is available from the Federal Office).
If the items are carried by your Divisional Bookshop, but are not in stock, your order will be taken and filled as soon as possible.
Divisions may offer discounts to WIA members — check before ordering. Postage and packing, if applicable, is extra.
All orders must be accompanied by a remittance.
The prices are correct as at the date of publication but, due to circumstances beyond the control of the WIA, may change without notice.

ICOM

Count on us!

Icom puts "intelligent" transceiver power in your hands

The future is yours today, in the brilliant new Icom range of handheld transceivers, that put real power in your hands.

Newly-developed AI (artificial intelligence) features in the amazing IC-P2AT and IC-P4AT make for easy operation. The "one-touch" AI button remembers previously used functions for simple repeat action, while a built-in test evaluates your knowledge, customising the unit to your ability. With 100 memory channels, optional 5W power, high speed scan and 24 hour system clock, this many features have never appeared before in such a tiny unit.

For dual band FM Transceiving the IC-W2A gives you simultaneous dual band receiving in the smallest unit in its class. 3-way tuning system, 60 memory channels, 2 call channels are just a start. Optional pager and code squelch functions allow selective calling to individuals or groups. Completely independent speaker jacks, volume and squelch controls are some more of the features in this slim unit that fits comfortably in the palm of your hand.

And for the very best in 2M and 70CM handheld transceivers, offering you full 50-905 Mhz wideband receiving, the IC-2SRA and IC-4SRA give you the works. Widen the borders of general coverage receive with VHF and UHF frequencies plus simultaneous dual band receiving. Rugged, splash resistant handhelds, with dual controls, speaker jacks and antenna, these units go beyond the average amateur's needs, with features like 24 hour clock, On/Off timer, advanced scan functions and total recall capability.

Whatever your transceiving needs, ICOM can give you the future, right now.

For further information call free on (008) 338 915 or write to Reply Paid 1009 Icom Australia Pty Ltd P.O. Box 1162 Windsor Victoria 3181 Telephone (03) 529 7582 A.C.N. 006 092 575

ICOM Australia's warranty is only applicable to products purchased from their authorised Australian Dealers.